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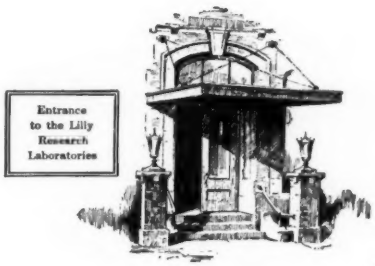

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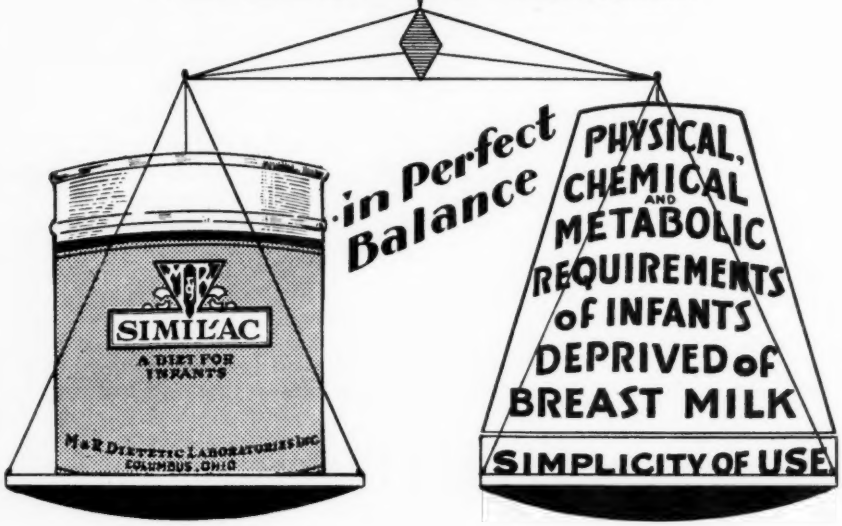
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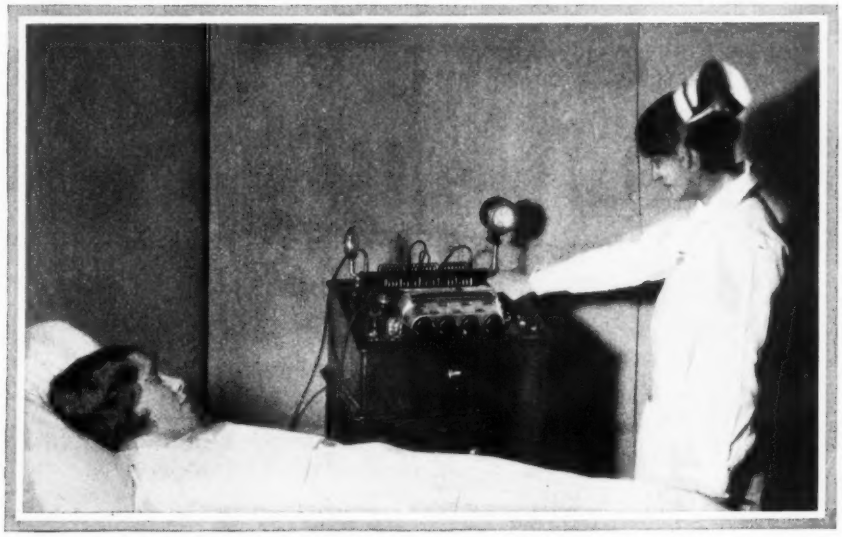

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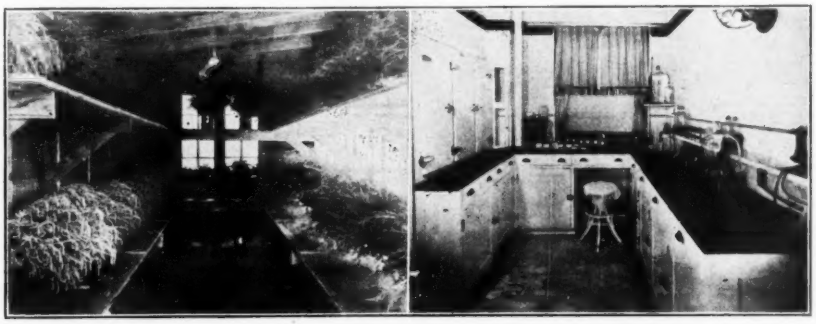

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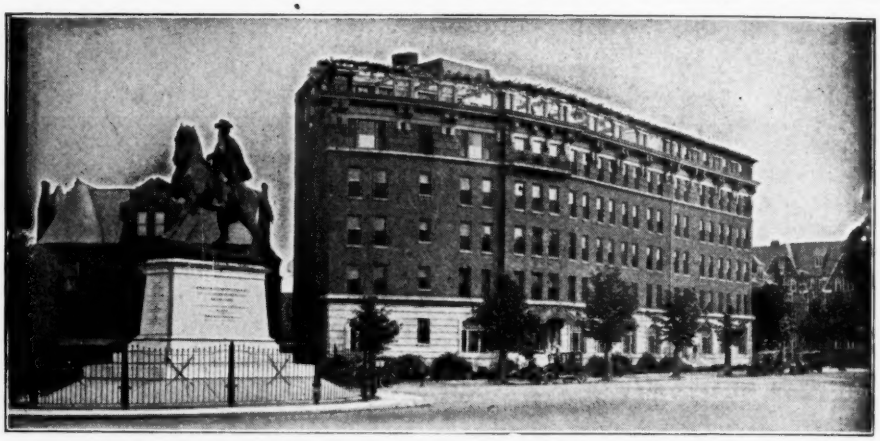

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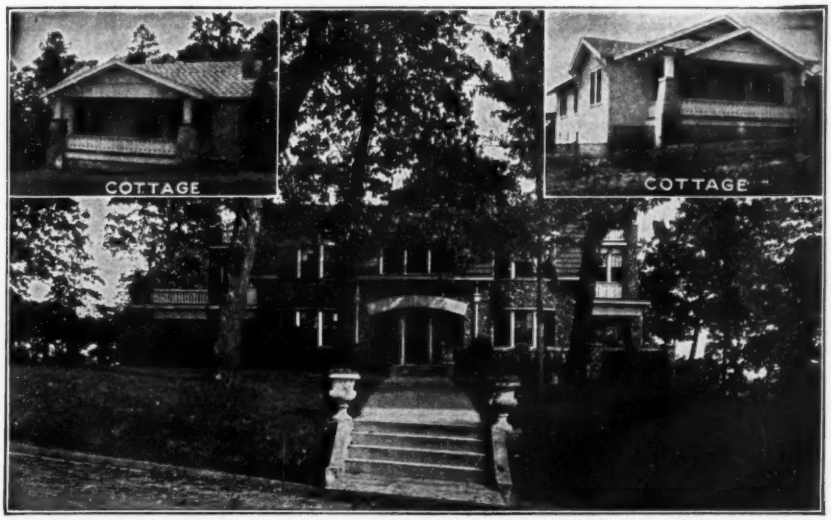

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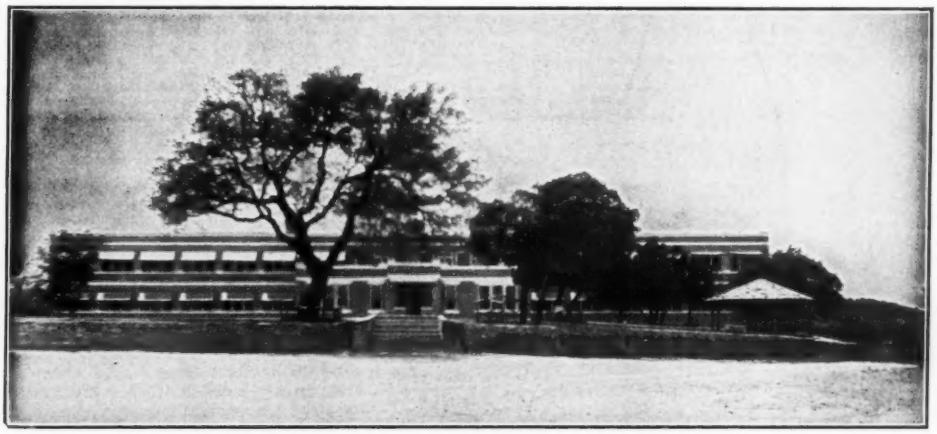

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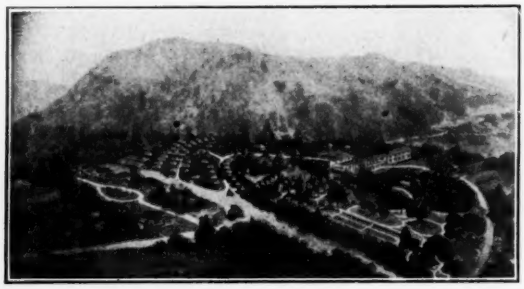

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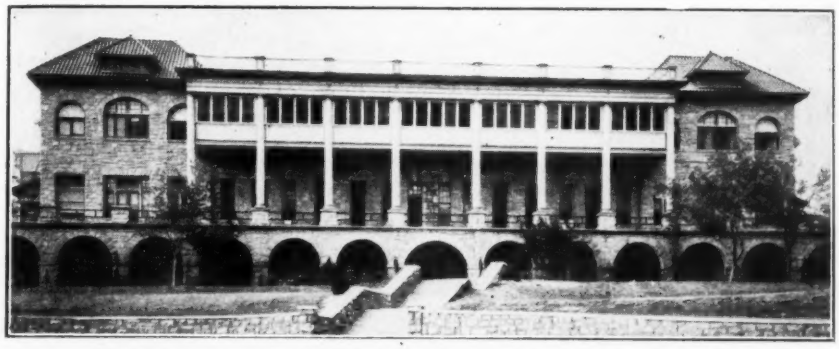

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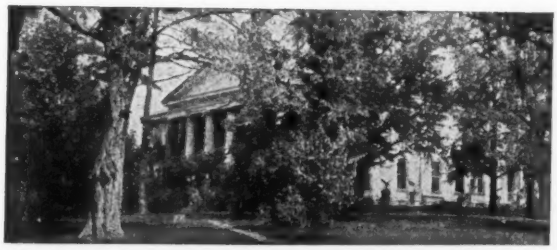

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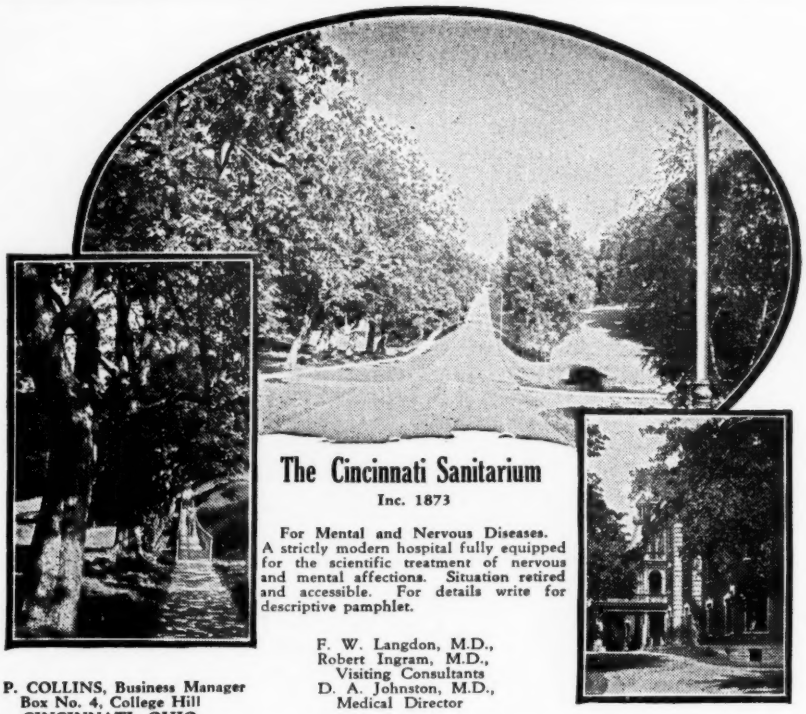

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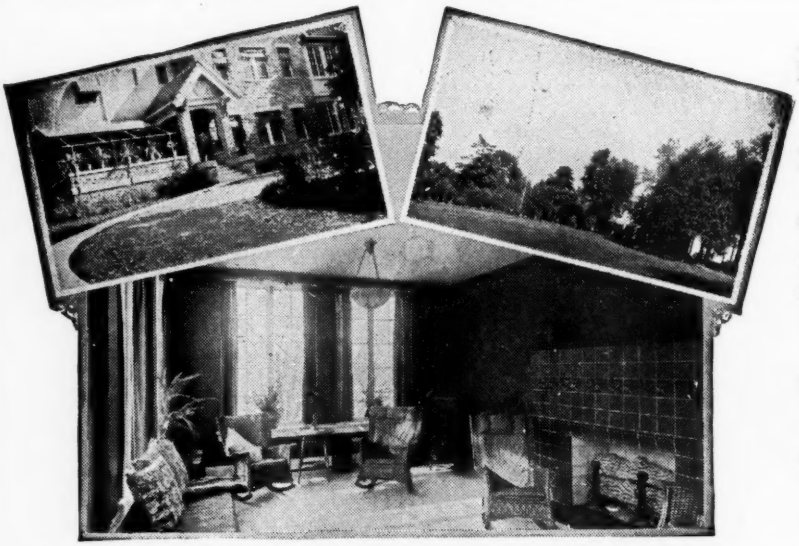

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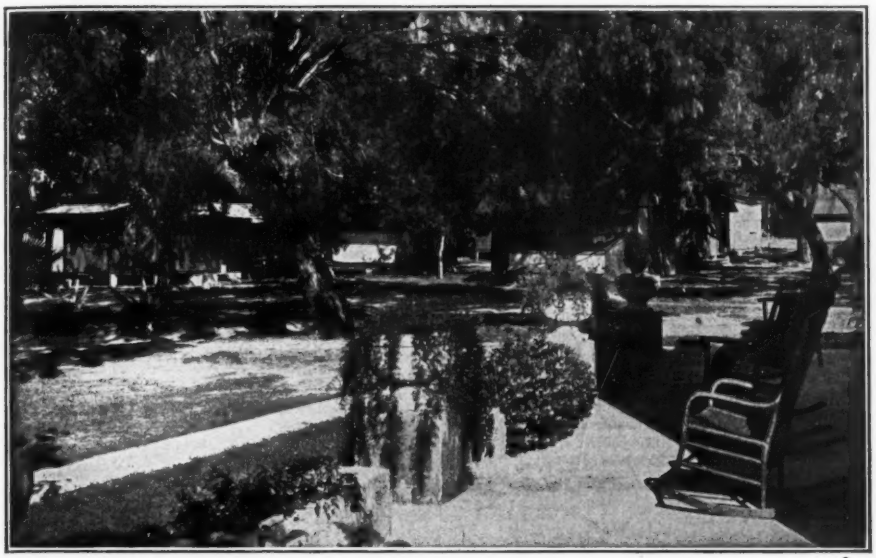

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MAGNETIC INTRA-OCULAR FOREIGN BODIES: LOCALIZATION AND REMOVAL WITH GIANT MAGNET*

By J. W. JERVEY, M.D.,
Greenville, S. C.

It has been my fortune to operate upon a number of cases for the removal of magnetic intra-ocular foreign bodies. This was successfully accomplished in each case by the use of the giant magnet. In one (the foreign body had been undiscovered for ten days) the eyeball was enucleated a few weeks later on account of the possible occurrence of sympathetic ophthalmia in the fellow eye. In this case the foreign body measured 16.5 by 1.5 by 6 mm. and great havoc had been wrought in the ocular tissues by it; yet healing was prompt and satisfactory. In every case healing ensued, but of course with varying results as to salvage of visual acuity. This, I believe, is the experience of all who engage in this work. The prognosis is necessarily uncertain, both as to the saving of the vision and of the eyeball itself, and months should elapse before certainty is expressed.

Early diagnosis is of the utmost importance. Yet, strangely enough, many cases are not recognized until days or weeks have passed and stubborn refusal of recovery spurs the attending physician to suspect the presence of a foreign body.

It is my belief that every eyeball showing a definite traumatic solution of continuity should be held guilty of harboring a foreign body until proved innocent. The history of the case is usually clear, and the cause of the accident known. Practically every intra-ocular foreign body is metallic. If the ophthalmoscope fails us for any reason, then we must have recourse to roentgenology.

Having determined the presence of an intruder, it becomes desirable to localize it, at least reasonably approximately, and it is to this practical point that I should like to direct attention. The very precise method of Sweet is, of course, beyond criticism from a standpoint of scientific procedure; but it is a difficult and complicated technic, and few roentgenologists can manage it satisfactorily. I have, therefore, devised and adopted a plan which gives at least a close approximation to accuracy, and is certainly sufficiently informative in every case to admit of the highest percentage of successful operative interference. The simplicity of its performance is equaled only by its practical efficiency. The lantern slides will serve to illustrate my meaning. My procedure is as follows:

With a delicate toothed forceps, after light local anesthesia, a fold of bulbar conjunctiva is picked up about 3 mm. above the upper corneal limbus and a small Cushing silver wire brain clamp (identical with the device I have used for many years for control of hemorrhage in tonsillectomy) is fastened to this fold of conjunctiva. In the same way a similar clamp is placed below the cornea. This gives two fixed points for localization, which also indicate for us the position of the eyeball when the picture is made. A light dressing is applied. Antero-posterior and lateral x-ray pictures are then

*Read in Section on Ophthalmology and Otolaryngology, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

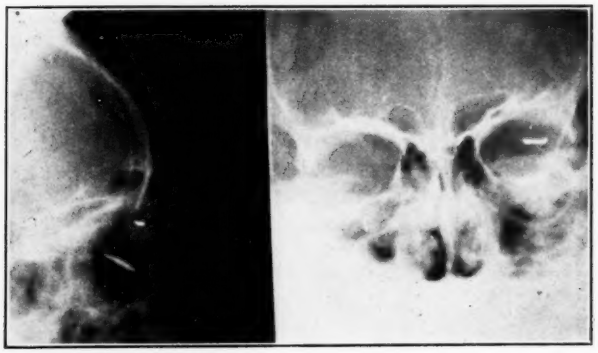

Fig. 1
Only an upper clamp was used in this case. The large foreign body is shown lying on the floor of the bulb.

Fig. 2
The A-P picture was taken first. The small foreign body is seen in this view lying just above the internal end of the lower clamp. In the lateral view the lower clamp is turned and we knew it had slipped. The foreign body is seen just at this clamp's anterior tip, the clamp having slipped around into the external canthus. Position was nevertheless accurately determined.

Fig. 3
In the lateral view the foreign body is clearly seen just posterior to the lower clamp. In the A-P view it is just above the lower clamp. It was therefore in the vertical median line close to the ciliary body.

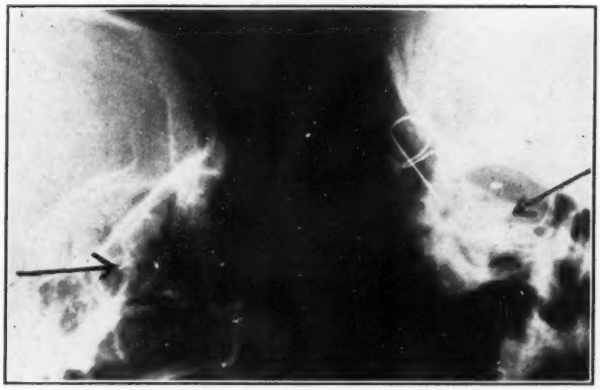

Fig. 4
In the lateral view the foreign body is some distance posterior to the lower clamp in the horizontal plane. The position of the clamps shows that the eyeball was rotated upward. In the A-P the intruder shows almost in the vertical median line and a little more than half way from the upper to lower clamp. It was therefore located as suspended just below and a little anterior to the center of the vitreous.

Fig. 5
The large foreign body is easily seen just below and behind the upper clamp. It is in close relation to the clamp in both positions, and is in the upper base of the iris and anterior margin of the ciliary body.

made (I prefer stereoscopic views) and the relative position of the foreign body to the known position of the clamps is noted. The clamps are then removed. The actual position is easily determined to within 1 or 2 mm. at the most, and this information is amply sufficient for the practical work of removal with the magnet.

Unless the foreign body is in the lens, iris or anterior chamber, or unless the wound is very recent with accompanying destruction of the lens, I prefer the posterior route for extraction. This is done by dissecting back the conjunctiva and making a T-shaped incision of appropriate size through the sclera and its underlying tissues posterior to the ciliary area. To me it seems preferable to have the patient lie supine upon the table, the giant magnet suspended a few inches above the eye. The operator then raises the patient's head to proper contact with the magnet tip, and the current is applied. The scleral wound is left severely alone, but the conjunctiva is sutured back over it.

The incision should always be made in one of the quadrants of the bulb situated between

the rectus muscles, entering that quadrant which is nearest to the position of the foreign body. It should, of course, be beyond the ciliary area, and as near as is practicable to the intruder itself.

DISCUSSION (*Abstract*)

Dr. H. H. Briggs, Asheville, N. C.—The use of the two metal clips, one placed 3 mm. above the cornea and the other 3 mm. below it, in the vertical meridian of the eye is for the purpose of definitely localizing these points on the eye, so that they may be seen and recognized in the x-ray picture, whether in the antero-posterior or lateral position. Without these one is lost. One has no place to reckon from. But with them one can note in the frontal picture whether the foreign body is on the right or left hemisphere, and whether it is in the superior or inferior hemisphere of the eye. He can, in other words, note which sector of the eye contains it and its relative position in that sector. Then, in the other picture, the lateral view, the foreign body may be located with reference to its distance from the line of the two clips, and an idea may be gained as to its distance in front of or in back of the plane of the equator, and of its distance above or below the horizontal plane.

One thing that enters into the problem very materially is the accuracy with which the eye is placed and maintained in the primary position while the x-ray is being made. It is necessary to get a true antero-posterior view and a true lateral view of the eye; for in proportion to the angular error of placement of the eye will be the error of the projection of the image of the foreign body on the plate and consequently the error of localization. This is especially true the farther the foreign body is from the center of rotation of the eye.

The localization may be judged with greater accuracy, also, the closer the foreign body is to the line of the two clips; and with least accuracy if it is at the posterior pole, farthest away from the clips.

While I still recommend and use the Sweet method, I recommend Dr. Jervey's method highly in cases like those which he mentioned, where the ophthalmoscope is of no value, and when the Sweet instrument is not available.

This is an example of what may be done by painstaking care with the x-ray alone.

Dr. Michael P. deBoe, Miami, Fla.—I should like to emphasize the method of using the silver wire clamps on the conjunctiva. It is a simplified technic and a rational procedure.

It may prove of value in certain cases to have the gross refraction of the eye. This may be obtained if the media are not clear by examining the other eye with the retinoscope or checking the patient's glasses if he wears any. This is to assist in determining the length of the eyeball in high myopes or hyperopes, in locating a foreign body in the posterior part of the vitrious chamber, or in the orbit.

It is easy to fail to locate a foreign body, and important to use every means at hand.

The next point in which I most heartily agree with Dr. Jervey is in the use of a T-shaped incision in the sclera for the removal of foreign bodies. Its advantages are obvious.

Dr. M. Earle Brown, New Orleans, La.—Dr. Jervey's paper demonstrates two things: first, that he has had a great deal of experience in removing intra-ocular foreign bodies; and second, that he has had trouble with the Sweet method, as we all have had. The reason is that we do not make the interpretation ourselves, but depend on the roentgenologist to do it.

I am going to try Dr. Jervey's method.

Dr. Arthur K. Hoge, Wheeling, W. Va.—There are possible disadvantages in this method. One is that the oculist must be present when this radiograph is taken in order to adjust the clips. The radiologist could learn the technic, but if he is a good enough man to learn the technic of this operation he should be able to master the Sweet method, which is certainly very accurate There is a possibility also of trauma to the conjunctiva. I doubt that there is much danger from that, however.

The Sweet method can be mastered by any roentgenologist who is a roentgenologist, and by it foreign bodies are easily localized. These cases are never absolute emergencies. Of course they should be attended to as quickly as possible, but in most cases one can find a good roentgenologist who has mastered the technic of the Sweet method.

Dr. W. R. Buffington, New Orleans, La.—Those who have removed foreign bodies and have had trouble in getting the proper interpretation of plates from the roentgenologist know that this practical method will be helpful. The ophthalmologist ought to be present during the examination because the foreign body should be removed as quickly after it as possible.

I wish to ask why Dr. Jervey selects the posterior route. Why would not that lead to serious intra-ocular hemorrhage and later, from perforation of the retina, to detachment of the retina? From my experience one of the greatest causes of blindness following intra-ocular foreign bodies has been perforation of the retina and, later, detachment.

Dr. E. H. Cary, Dallas, Texas.—I have had no experience with Dr. Jervey's method, but I can see its value. It is exceedingly valuable to a man who has not a trained roentgenologist at his disposal, and it certainly would be an advantage to the roentgenologists to utilize the method.

Recently, in a New York clinic one afternoon, I saw two foreign body cases, in neither of which was the foreign body removed, although efforts were made from various angles. The patients were sent away, to be taken up again the next day. The work could have been terminated that day if a better method of localization had been used. If the physicians had had some aid to the Sweet method, the removal of the foreign bodies might have been completed at a more favorable time.

I think this method will be very valuable not only to the man out in the country, but to the best trained and equipped oculists as well.

Dr. Oscar Wilkinson, Washington, D. C.—I wish to report a foreign body in the eye which was located by one of our best roentgenologists as just posterior to the globe and external to the macular region. We felt loath to search the back of the eye for this foreign body, thinking it was back of the globe. I did a com-

plete tenotomy of the external rectus muscle to inspect this area of the eyeball, which I found normal. I made an incision through the sclera with a cataract knife, and then introduced just inside the eyeball the point of a Stevens scissors, attached a magnet, and drew out the foreign body.

I wish to suggest the use of a small pointed instrument of this kind for removing a foreign body from the posterior portion of the eyeball, especially when you are not in possession of a giant magnet.

Dr. M. L. Dillon, Charleston, W. Va.—I agree with Dr. Jervey in regard to the posterior route of removal, unless the foreign body is where it can easily be seen from the front, regardless of the amount of damage it has done in entering the eye. In practically no case have we been able to remove foreign bodies from the front without enlarging the point of entrance in the cornea.

Dr. H. J. Blackmon, Tampa, Fla.—During an internship at the Wills Eye Hospital in Philadelphia I had the opportunity to take a number of x-rays of foreign bodies in the eye during sixteen months, and I found that several methods of localization were accurate, but not accurate in every instance. I checked the Sweet method by the method used by Dr. Jervey, except that no clamp was used, but a small silver wire loop was fastened by a suture. A third loop was used on the horizontal plane 3 mm. back of the limbus. Both of these methods checked very accurately, and the foreign body was removed by a magnet.

Dr. Jervey (closing).—Dr. Hoge's objection that the oculist should be on the spot when the x-ray pictures are made could hardly be an objection. It is just as well for us all to inspect our x-ray plates and not depend altogether on the roentgenologist. As a matter of fact, it is a simple matter for the oculist to apply this method in the office, put a bandage over the eye and send the patient to the roentgenologist. If the work is done in a hospital, the chances are that the x-ray man is on the ground and it can be done there.

Dr. Brown asks why I prefer the posterior route. Dr. Dillon has really answered that question for me, but in addition I might say that there is always more danger of iris prolapse, danger to the lens and ciliary body in going after a foreign body anteriorly unless there are special reasons why you should do so. When the foreign body is deep-seated the scleral incision is not dangerous; there is practically no danger of detachment of the retina because it is supported by the body of the vitreous; there is no danger of infection, and I have seen no hemorrhage. So I think the chances are reasonably good by using the posterior route.

Dr. Wilkinson mentioned a practical point in the use of scissors or some other sharp-pointed instrument through the wound. There is more than one reason for that. If the foreign body is in the posterior pole of the eye, even a very strong giant magnet will at times fail to dislodge it, if it has been there several days. But by introducing a slender instrument through the scleral wound, which one can almost always do properly, the magnet will act miraculously, and although you cannot get as strong current through the smaller instrument as through an ordinary giant magnet tip, yet being in so much closer contact, the foreign body is more easily dislodged. It is a practical point of great importance.

RESULTS FROM PHARMACOLOGICAL STUDIES OF NORMAL AND PATHOLOGICAL LIVER CONDITIONS*

By PAUL D. LAMSON, M.D.,
Nashville, Tenn.

In spite of the innumerable references which have been made in recent years to the interrelationship of all parts of the body, we are still too apt to think of any organ such as the liver as being an entity; something apart, having definite and separate functions. Liver cells may, of course, have functions which no other cells in the body have, but they are all immersed in the common blood stream which binds all tissues of the body together in a balanced whole. Thus a discussion of any one disturbance apparently connected with the liver leads to almost every other part of the body. I shall, therefore, make no attempt to review liver functions as a whole, but merely shall point out a few functions of the liver in the study of which I have been closely associated. These functions may be thought of as belonging to two classes: mechanical and chemical.

If we look at a diagrammatic sketch of the circulation we see that the liver lies in the path of greatest blood flow. It is the one large fluid reservoir of the body and, as we know, can take up enormous amounts of liquid from the blood through its very permeable vessel walls. This can be shown by injecting adrenalin intravenously when it will be found that obstruction to portal flow occurs, the portal pressure rises, the liver swells greatly, fluid is poured out from the liver lymphatics and the blood becomes concentrated, causing an acute polycythemia. No such polycythemia occurs, however, if the liver is first removed from the circulation. Just how this obstruction to blood flow through the liver takes place we do not know, but it may be that adrenalin constricts the hepatic veins which have strong muscles. That such a mechanism may operate in the normal animal is shown by the fact that if a dog is allowed to bark at a cat, causing the secretion of adrenalin, the cat's red count may be raised to fifteen or sixteen million in two or three minutes.

Another mechanical function of the liver is

*Clinic, General Clinical Session, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

*From the Department of Pharmacology, Vanderbilt University School of Medicine.

the part played by the hepatic artery. The movement of red cells during the changes mentioned above can be completely controlled by ligating the hepatic artery; adrenalin can be injected without the production of polycythemia. I believe that the driving force of the arterial blood supply is necessary to keep the erythrocytes in motion through the liver in such cases of high portal pressure. This may sound like a purely artificial experiment, but I wish you would consider it at your leisure, as this is a function of the liver which is entirely overlooked. Why, for instance, does no polycythemia occur from the injection of adrenalin in the rabbit, although the portal pressure rises after adrenalin and there is the same swelling of the liver as in the dog? I also defy anyone to raise a rabbit's red count by attempting to excite him, in spite of his universally imputed timidity.

I regret that time will not allow us to take up the possible ways in which polycythemia may be produced, and the factors which must be considered whenever we speak of blood volume change, concentration of the blood, and so forth, but I hope these few facts may serve to remind us that the liver does play an important part in controlling the red cell concentration of the blood.

Midway between the mechanical and chemical functions of the liver lies a function which might be considered as belonging to either of the other two classes, namely: the ability of the liver to pick out specific substances from the blood stream and excrete them through the bile. You will remember that Professor Abel found the first of these substances, phenoltetrachlorphthalein, and used this to test liver function by injecting it into the blood stream and collecting the excreted phenoltetrachlorphthalein in the stools. Dr. Sanford Rosenthal later suggested that the curve of disappearance of this dye from the blood stream might give an equally good index of liver function and be much simpler than the older method. You are acquainted with his work on this method of studying liver functions in both animals and man.

Finally we come to a consideration of the great mass of chemical liver functions. Many of these have been used in one way or another as tests of disturbance of function, but I shall touch only upon those with which we have had experience in certain studies on carbon tetrachlorid.

In 1921, Dr. Maurice C. Hall, of the Department of Agriculture, introduced a new drug for the treatment of hookworm disease, carbon tetrachlorid. It was soon found that, although as many as 50,000 consecutive cases might be treated without any severe symptoms, an occasional unexplained death would occur. The only thing which could be found at autopsy was an acute central necrosis of the liver. With the aid of the International Health Board, a series of investigations on the cause of these unexplained deaths was begun. The examination of some five thousand sections of all types of body tissue after the administration of carbon tetrachlorid showed no consistent lesions except in the liver.

We hoped to be able to quantitate the degree of damage done by this drug by some of the usual liver function tests. The phenoltetrachlorphthalein, blood fibrin, biliary index and levulose tolerance tests were run on a large series of dogs before, during and after the administration of carbon tetrachlorid in varying amounts. Besides this, a study of the changes in many blood constituents were made and liver sections taken from all these animals.

It was very soon found that the degree of disturbance in these various functional tests in no way corresponded to the symptoms and signs of intoxication. Animals might show no symptoms whatever in spite of having a liver in which apparently less than 10 per cent of normal tissue remained, and in spite of having a definite derangement of the various functional liver tests. We learned that it was impossible to use morphological liver changes as a quantitative index of intoxication, as very small doses of carbon tetrachlorid might give maximum amounts of necrosis. It was also found that these different functions varied in their susceptibility to carbon tetrachlorid; for instance, doses of 0.25 to 0.5 c. c. per kilo cause severe morphological changes in the liver and reduce the blood fibrin greatly. Such doses would, however, not change the biliary index, levulose tolerance nor phenoltetrachlorphthalein tests. Doses of between 2 and 4 c. c. per kilo were necessary to produce striking changes in the phenoltetrachlorphthalein curves. We also found that when definite changes in these functions were brought about by carbon tetrachlorid, no matter how much more was given apparently no greater changes could be produced. None of this work gave a clue to the cause of intoxication, as it was impossible to produce symptoms.

We then hoped that, by giving repeated doses of carbon tetrachlorid, more severe lesions might be produced and a greater disturbance of function brought out. Increasing morphological changes could be produced by repeated doses of carbon tetrachlorid, but much to our surprise it was found that after two or three weeks of such treatment all liver function tests returned to normal and continued so, although after even six months to a year of treatment a typical cirrhosis was produced (*Fig. 1*). From a functional point of view one might suppose that in these severely damaged livers sufficient regeneration occurs to supply normal function. On the other hand, we could never understand why a dose of carbon tetrachlorid would not derange this regenerated liver tissue and cause a disturbance in function in the same way that it does normal tissue. This, I believe, opens an interesting field for investigation.

From these studies we could only conclude that the degree of morphological change was a very poor index of functional disturbance. The blood fibrin test was unsatisfactory for the reason that blood fibrin showed either slight changes or fell almost to zero, not allowing careful quantitation. The levulose tolerance test is complicated by an enormous number of extraneous factors; the phenoltetrachlorphthalein test is also difficult to quantitate, as one is dealing with two elements, namely: the concentration in the blood and the time of disappearance of dye. For example, which animal shows the greatest disturbance: one in which the dye remains in the blood at a high concentration for a fairly short length of time, or one in which the concentration falls very rapidly to a very small percentage and then remains at that level for a long period of time? We felt that the simplest test was the biliary index which could be determined with great ease by simply comparing the color of the blood plasma with standard bichromate solution. These findings, of course, refer to acute intoxications only, and I do not wish to infer that the tests will have the same relative value in other conditions, such as chronic clinical cases.

Fig. 1

Liver from a dog weighing 5.6 kg. given 11 doses of 2 c. c. of carbon tetrachlorid per kg. at intervals of from one to two weeks over a period of three and one-half months.

It was impossible in Baltimore to produce intoxication in dogs by oral administration of carbon tetrachlorid in spite of these liver changes. When the work was transferred to the Department of Pharmacology at Vanderbilt University the dogs at first showed the same resistance to carbon tetrachlorid as in Baltimore. Suddenly, however, dogs which were being given repeated doses for the production of cirrhosis became extremely ill and died. We could not account for this until Dr. Minot, working with us, observed that they were dying with tetany similar to that seen in infants who lacked calcium. It was found that proper calcium therapy would save these animals and that the cause of the susceptibility was a calcium deficiency, because the man in charge of the animal house, to save expense, had fed the dogs meat with no bones.[1]

For the first time we were thus able to study carbon tetrachlorid intoxication. The same liver function tests were carried out on these susceptible animals. It was found that the degree of intoxication could not be determined by following any one of these functional tests; although the biliary index again served as the best test for determining a degree of intoxication, animals which were extremely ill and later died might show an almost normal biliary index. These experiences with the resistant and susceptible dogs bring out, I believe, the important

fact that, although these functional tests may be of decided value when all conditions are known, no single one of them alone can be relied upon to give a good idea of what is going on in the liver.

Another interesting question is why a diet which was exactly the same as that on which dogs showed resistance to carbon tetrachlorid, except for the difference in content of bones, should increase the susceptibility to this drug. Dr. Minot and Miss Cutler showed that it was merely calcium lack which caused this susceptibility, that the addition of calcium to this bone-free diet brought back the resistance to carbon tetrachlorid. They also showed that the blood calcium in these animals was normal. All factors in this intoxication have not yet been worked out, but in a long series of experiments Dr. Minot and Miss Cutler have been able to throw much light on the intoxication.[2] They found that after the administration of carbon tetrachlorid to susceptible animals there was a decided fall in blood sugar. They also found that there was an increase of guanidine in the blood and that, although the feeding of meat to normal animals gives no increase in blood guanidine or changes in blood sugar, the feeding of meat to susceptible animals caused a tremendous increase in blood guanidine with a fall in blood sugar, tetany, convulsions, gastro-intestinal hemorrhages and death, all of which changes may occur in guanidine poisoning. Calcium is well known to offset the action of guanidine and very ill animals could be brought out of convulsions and saved by intravenous calcium therapy. Others less severely ill could be made to recover by oral administration of calcium or any other method which would theoretically increase the ionized calcium in the blood. Finally, they found that a sufficiently high calcium diet would protect the animals against intoxication, although it in no way affected the pathological changes observed after carbon tetrachlorid. Further studies have shown a far-reaching derangement of various blood constituents and physiological reactions of the body, all of which goes to prove what was pointed out at first, namely: that any disturbance in one organ affects all of the others.

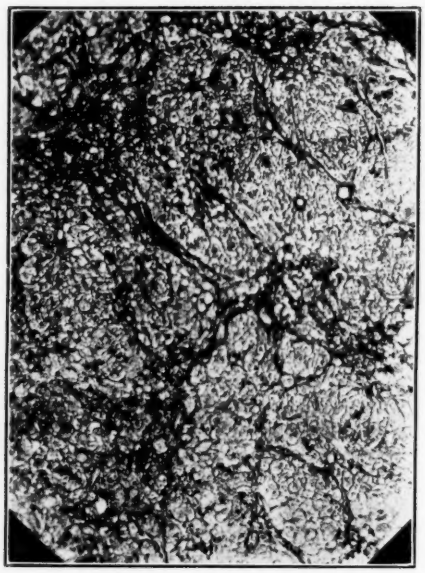

Fig. 2
Section of cirrhotic liver showing scarring, absence of lobulation, necrosis, and fat formation.

These experiments are of interest in relation to the diet in liver disturbances. Whipple pointed out long ago that a high carbohydrate diet protected against chloroform poisoning. He reached these conclusions from morphological studies of the liver. We could not agree with these findings at first, as we were unable to use the morphological changes for quantitative studies. The experiments of Minot and Cutler bring out very strikingly, however, from an entirely different course of reasoning, the fact that a high carbohydrate diet, or particularly a bread and milk diet, may be the best in liver disease. Bread and milk would give an adequate supply of calcium and replenish the glycogen stores which are drained by guanidine if it is formed. Such a diet would also have the advantage that it contains no meat, which is apparently a source of guanidine where the liver does not function properly.

Those of you who are interested in the clinical application of these findings will, I think, be struck at once by the fact that calcium might be of value in many pathological liver conditions. I use the word "might" because we are as yet unable to differentiate liver conditions sufficiently to be certain in which conditions any treatment would be useful. A few cases have been studied by Miss Cutler and Dr. Minot, which bring out the fact that the same condition seen in these animals occurs in the clinic.[3]

One case of arsphenamine poisoning with severe jaundice showed a high guanidine and low blood sugar which responded to calcium therapy. Another patient,

a baby with congenital obstructions of the bile duct and a tremendous biliary index, showed a high guanidine and low blood sugar. The blood sugar could be raised temporarily by sugar injections, but very quickly fell again. Calcium injections, however, raised and maintained a normal blood sugar level, stopped the convulsions and allowed normal feeding. The most striking condition was that seen in eclampsia, where it has long been known that liver disturbance takes place, convulsions occur, and the blood sugar often falls. Several cases of eclampsia were studied, and low blood sugars and high guanidine were found. One case gave very striking results under calcium treatment. This woman came in with severe convulsions, vomiting and blind, with a blood sugar of between 60 and 70. Within a very few minutes after the intravenous injection of calcium she stopped vomiting; within 20 minutes the convulsions ceased, within one-half hour the sight returned to normal, and within an hour the blood sugar was between 90 and 100. These cases illustrate what may be done with calcium if the proper conditions are present.

Finally, I should like to mention some work which Miss Ward and I are carrying out on the dangers of giving calcium intravenously. Little attention is paid to the toxicity of this substance, although an overdose is certain to cause instantaneous death, probably from ventricular fibrillation, which cannot be remedied. It is as yet impossible to determine by chemical means, such as blood calcium studies, whether a patient needs calcium or not. These very sick dogs and the blind eclamptic all had a normal amount of blood calcium. It is not a question of blood calcium alone, but of active or ionized calcium which determines the need of calcium medication. One can, therefore, decide upon the need of calcium therapy only from symptoms, except in those cases where there is a definitely low blood calcium. Oral therapy should be considered before one feels that the intravenous method is necessary. Although hundreds of patients have been treated with intravenous doses of calcium, equivalent to 10 c. c. of a 10 per cent calcium chlorid solution, one death is known to have occurred before all of this amount had been injected, another subject almost died, and many have collapsed. Our animal experiments show that there is great variation in the susceptibility to calcium, but that large amounts of calcium may be injected if they are injected sufficiently slowly. If, therefore, calcium must be used intravenously we suggest that it be used as the gluconate in weak rather than strong solutions and injected very slowly, stopping at least temporarily where any irregularity or marked slowing of the heart occurs.

These experiments serve to show how intimately the structures and functions of the body are connected. No function of any organ may be considered separately, but each must be considered in its relation to a given state in the whole organism. They bring out also, I believe, the value of pharmacological methods in producing abnormal, functional and morphological conditions which may allow a study of functions not recognizable in the normal individual.

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REPORT OF A NEW INSTRUMENT FOR THE REMOVAL OF THE OPEN SAFETY PIN*

By Hilliard Wood, M.D.,
Nashville, Tenn.

The number of forceps devised for the removal of open safety pins from the esophagus and stomach indicates that so far none of them has been generally satisfactory. I have taken the liberty of adding one more to this already considerable list.

Some two years ago I devised a plan for an instrument to handle the open safety pin in the esophagus. This instrument was made for me by George P. Pilling & Sons Company, Philadelphia. The instrument differs in no way from other esophageal forceps except that the jaws, when closed, form a ring in which the safety pin is held loosely and allowed to rotate, but not to escape from the control of the operator.

Either with the esophagoscope, or under the fluoroscope, the forceps are passed closed down to the pin, when the instrument is opened, and either prong of the pin inclosed in the ring of the forceps. The pin is then pushed on into the stomach and immediately the forceps are slowly withdrawn when the pin will rotate so that its open point is down. It is withdrawn through the esophagus from below up and out of the mouth.

My first experience with this forceps was on April 13, 1929, when I was called to Vanderbilt Hospital to

*Read in Section on Ophthalmology and Otolaryngology, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

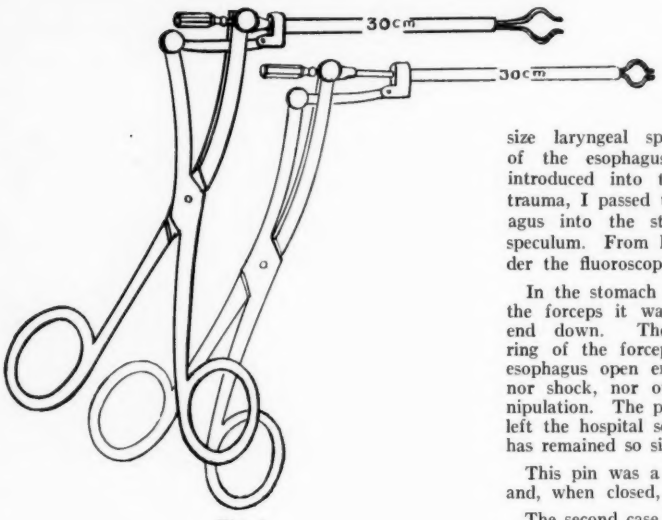

Fig. 1

see a child, W. D. N., twelve months old, who had swallowed an open safety pin. The fluoroscope showed the open safety pin in the stomach.

Without anesthesia, local or general, and using Jackson's infant size laryngeal speculum to expose the upper end of the esophagus so that the forceps might be introduced into the esophagus with the minimum trauma, I passed the forceps down through the esophagus into the stomach and removed the laryngeal speculum. From here on the operation was done under the fluoroscope.

In the stomach the pin was open end up, but with the forceps it was maneuvered into a position open end down. The pin was then inclosed in the ring of the forceps and was drawn up through the esophagus open end down. There was no bleeding, nor shock, nor other disturbance following this manipulation. The patient ate regularly, in a day or two left the hospital seemingly in a normal condition, and has remained so since.

This pin was a small gold safety pin 20 mm. long and, when closed, 4 mm. broad.

The second case was seen May 23, 1929. A child, G. L. S., eight months old, had swallowed an open safety pin and was referred to me the same day. The fluoro-

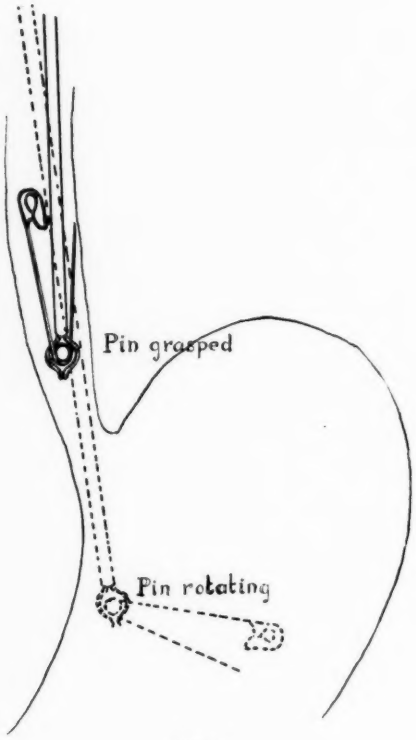

Fig. 2

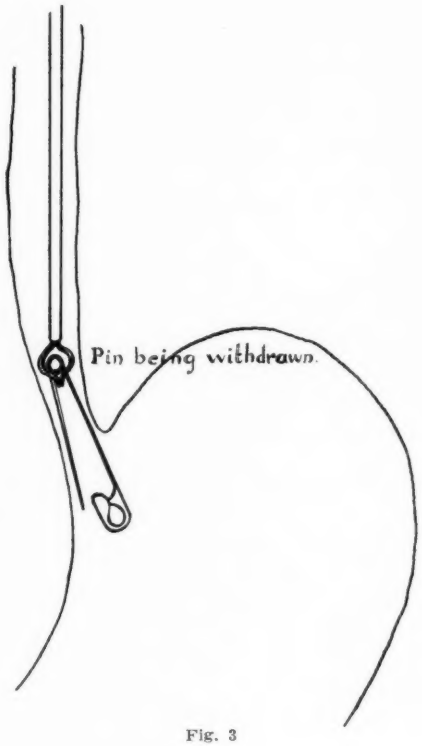

Fig. 3

scope showed the pin in the cardiac end of the stomach. It was removed in the following way:

Without anesthesia, either local or general, the Jackson infant size speculum was introduced to expose the opening to the esophagus and to facilitate the introduction of the safety pin forceps with the least possible trauma. The safety pin forceps were passed down the esophagus into the stomach. The laryngeal speculum was removed. From here on the operation was done under the fluoroscope. The pin was seen in the cardiac end of the stomach an inch or so from the position of the forceps. By pressure upon the left side of the abdomen the pin was, after two or three minutes, moved towards the right in line with the forceps. The ring of the safety pin forceps was closed around the shank of the pin and the pin drawn up through the esophagus and out through the mouth.

In each of the above two cases the following facts are of interest:

(1) No anesthesia, either local or general, was used.

(2) No gastrostomy or other wounds were made. There was no blood shed.

(3) Only two instruments were used: (a) laryngeal speculum, (b) safety pin forceps.

(4) No esophagoscope was used.

(5) The actual removal of the pin was done under the fluoroscope.

(6) The time of each operation was from five to ten minutes. This time was practically all taken up in getting the safety pin in the stomach in the correct position to be grasped by the forceps.

(7) There was no shock following the operation.

(8) Within a few minutes the patients were able to nurse and retain milk and rested well the following night.

(9) It was found in the second case that manipulation of the abdomen would move the safety pin about in the stomach so as to bring it in line with the forceps.

If the open safety pin could be removed from the stomach as easily as this, it ought to be removed much more quickly from the esophagus, where it could be immediately grasped, passed into the stomach, reversed, and brought out.

The use of the fluoroscope, instead of the esophagoscope, appears to reduce trauma and to facilitate the removal of the pin.

DISCUSSION (*Abstract*)

Dr. Murdock Equen, Atlanta, Ga.—I have always found that the point of the safety pin was the most dangerous part. Once this point is safely in the esophagoscope the pin may be pulled out. The rest of the pin will take care of itself. In both of the cases presented by Dr. Wood the point was directed upward. It would be interesting to see just how this instrument would work if the point were directed downward. It would be quite possible for a small pin to rotate on its own axis, thus changing entirely its original position. This might be caused by manipulation at attempted removal, increased peristalsis, by forced swallowing of very coarse food, or by the use of the emetics. It will be a pleasure to use this instrument in the Bronchoscopic Clinic of Emory University.

The general practitioner and the baby specialist naturally are the first to come in contact with cases of this kind, and upon their ability to diagnose and refer them early to a competent bronchoscopist rests the outcome of many a life.

Dr. Arthur K. Hoge, Wheeling, W. Va.—I should like to ask Dr. Wood how long he waited after the pin was in the stomach before he attempted to remove it. We have found that every pin which we have seen which entered the stomach of its own accord, and several which we have pushed into the stomach, have passed through the intestinal tract and been recovered in a few days in the stools.

If the safety pin happened to be in the esophagus, especially the lower portion, it would be rather dangerous to introduce forceps blindly, without the aid of the fluoroscope, and grasp the pin, because in that portion of the esophagus there are large folds of mucous membrane, and even with ocular manipulation it is difficult to grasp the pin without including some of the mucous membrane. I would consider it a dangerous procedure.

Dr. Wood spoke of grasping the point of the safety pin, if I understood him. In my experience I have never been able to get hold of the point. If the pin is wide open it is pushed into the mucous membrane and it is impossible to find the point. As for removing the safety pin with the ring up and the point down, I have never seen a pin that would go down the esophagus that way; the pin will not enter the esophageal orifice. It may lie posterior to the larynx, but I believe it is a physical impossibility for the pin, point down, to enter the esophageal tract.

When children swallow safety pins which lodge in the esophagus and are pushed into the stomach by the physician, or when the pins go into the stomach of their own accord, we should allow at least ten or fifteen days for them to pass the pin. A pin which is small enough to go through the esophageal tract will enter the pylorus. It always enters with the point dragging. It follows the intestinal tract all the way through with the point dragging, and the dragging point never perforates. I think that is the dictum of Jackson. I like to give the pin a chance to pass spontaneously.

Dr. F. E. Hasty, Nashville, Tenn.—I have had the

good fortune to see something of this work. The whole thing of itself is so simple and safe, Dr. Hoge, that you are not justified in subjecting your patient to the risk of getting the safety pin hung up in the intestinal tract. I have seen patients die because the pin was hung. So when a safety pin is in the stomach it does not always mean that the patient is safe. If you examine the instrument I think you will find that it is so constructed that if it is properly used under the fluoroscope it will do no harm.

This is a simple procedure, and the patient looks so well when it is over that it should be carefully considered in any case of this kind. I have done bronchoscopies and having seen both good and poor results from them, I should want this procedure to be used on my own child.

Dr. Wood (*closing*).—I do not think that there is any danger from the dragging point as the pin is passed into the stomach rotated and brought up through the esophagus while open. The only two open safety pins I have removed with this instrument had gotten into the stomach before they came to me. These patients did not have any trouble from the dragging point and I do not see why the dragging point should do any harm.

The length of time that the pins had been in the stomach varied: the first one was eight to ten hours; the second one, three or four hours.

Of course, an open safety pin cannot go down the esophagus open end down, but the open end is down when it is brought up through the esophagus after having been rotated in the stomach.

I once had a patient with an open safety pin in the esophagus open end down which was brought out in this way. I had passed the open safety pin into the stomach, had rotated it and was bringing it up through the esophagus open end down when my hold on it slipped. I was operating under the fluoroscope and using a frail flat-jawed forceps. I laid aside the frail forceps I was using, picked up a stronger pair, grasped the safety pin and removed it. An open safety pin cannot be in the esophagus open end down, except under some such circumstances as this.

I have tried various methods of closing a safety pin, and frankly, have had little success with them. This instrument, I believe, is safe, it is simple, and it certainly is successful. It makes no effort whatever to close the pin. The other forceps I have tried all make some effort to close upon the pricking point as it comes up. In this the whole idea is the reverse.

In substituting the fluoroscope for the esophagoscope there are two advantages. When you look through an esophagoscope you see a limited field, just the part illumined by the end of the tube; but under the fluoroscope you see the whole field. In the second case the pin had to be moved, and I could see to do that.

The esophagoscope will produce more trauma than the fluoroscope, no matter by whom it is used. I was not surprised at getting these pins. The only surprise I had was at the ease with which I got them. It was no trouble at all.

THE TREATMENT OF TRAUMATIC ARTERIOVENOUS FISTULA*

By BARNEY BROOKS, M.D.,
Nashville, Tenn.

The knowledge which has been gained from recent investigations of the physical aspects of the circulation has made it possible to define more clearly the fundamental principles involved in the treatment of arteriovenous fistula. I believe a few surgeons had a fairly well defined and correct conception of the principles involved before the more modern experimental work was undertaken, but the records of their ideas are not easily available to us. The first clear-cut description of some of the most important fundamental principles involved in the operative treatment of arteriovenous fistula is to be found in a publication by von Oppel in 1908. This experience of von Oppel has already been translated and included, in part, in papers published by Halsted and by Brooks.

The purpose of this paper is to discuss briefly the conditions associated with an abnormal communication between an artery and a vein and the effect upon these conditions of the application of each of the several methods of treatment which have been used. Although the conditions present are similar in all instances of arteriovenous fistula, the discussion in this paper is meant primarily to apply to an instance of a fistulous opening between an artery and vein supplying an extremity.

The conditions present in an arteriovenous fistula are quite different from those associated with an arterial aneurysm. In a sense, one may think of an arterial aneurysm as an abnormality static in nature, while in arteriovenous fistula the abnormality is dynamic in character. The manifestations of arterial aneurysm come from pressure by or rupture of the aneurysmal sac, or mechanical obstruction of the stream of arterial blood. The manifestations of arteriovenous fistula are primarily the result of an abnormal distribution of the current of flowing blood. The arterial aneurysm is a dam or reservoir in the course of a flowing stream. The arteriovenous fistula is a break in the banks of the stream through which the stream is diverted into

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*From the Department of Surgery, Vanderbilt University, Nashville, Tennessee.

abnormal and undesirable channels. The fundamental principles of the treatment of these conditions, therefore, are in contrast. In arterial aneurysm, the problem is the eradication of the dam or reservoir directly or indirectly through the establishment of by-paths. The problem in arteriovenous fistula is the closure or obstruction of the channel of the diverted stream.

The exact mechanism by which an abnormal communication between an artery and a vein is established by trauma is as yet not clearly understood. In the experimental laboratory, a permanent arteriovenous fistula is very difficult to produce. In animals, even comparatively large fistulae established by careful blood vessel suture, in most instances close spontaneously. A fistula between an artery and a vein is apparently easily produced in man by seemingly gross methods and a very small fistulous opening may remain patent for many years. The abnormal communication between an artery and a vein is always associated with certain abnormalities in the circulation, both as regards the heart and the volume of blood flowing through the tissues supplied by the wounded vessels. Appreciation of the effects of an arteriovenous fistula on the heart is important in the determination of the advisability of undertaking operative treatment. Appreciation of the abnormal conditions of the circulation of the tissues supplied by the wounded vessels is imperative if the most appropriate operative technic is to be applied. The effects of abnormal arteriovenous communications on the heart has been very clearly described by Holman and by Reid and will not be discussed in this paper. The effects of an arteriovenous fistula on the circulation of an extremity can perhaps best be made clear by the use of diagrams.

Figs. 1a and *1b* illustrate diagrammatically the conditions present in arteriovenous fistula. The capillary circulatory bed between the artery and vein is indicated by the rectangular figures between these vessels. The collateral arterial and venous channels are indicated for a level in the artery and vein corresponding to the arteriovenous fistula illustrated in *Fig. 1b*. *Fig. 1b* illustrates the conditions present in an arteriovenous fistula. The blood from the primary artery may pass through the fistulous opening into the vein and return immediately to the heart. The blood in the primary artery which does not pass through the fistula reaches the capillary bed in the extremity. The relative amounts of the blood passing through the fistula in the vein or through the artery into the capillary bed depend upon the relative resistances offered in the capillary bed and at the fistulous opening. In other words, the larger the fistulous opening the greater the proportion of blood which passes through the fistula. Blood may also reach the capillary bed by way of the collateral arterial paths. The result of the arteriovenous fistula is, therefore, a diminution of the volume flow of blood and a diminution of the blood pressure

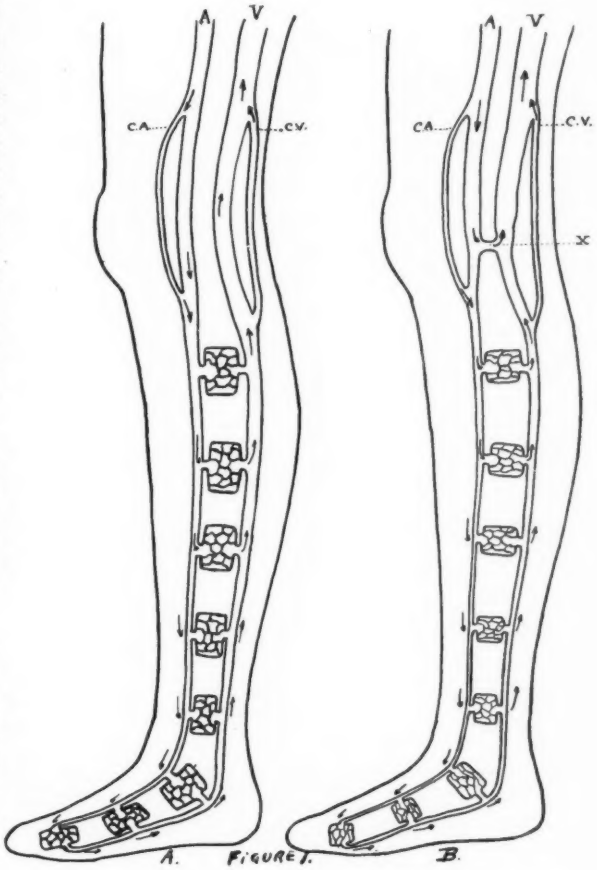

FIGURE 1.

in the arterial tree of the extremity distal to the fistulous opening. The diminished volume flow of blood is illustrated in *Fig. 1b* by the diminution in the area of the rectangular spaces and the diminution in blood pressure by the diminution in the heaviness of the lines depicting the circulatory network. These diagrams illustrate clearly that the establishment of a fistulous connection between an artery and vein results in a separate cycle for circulation and the volume of blood which flows through this abnormal circulation is derived from that destined for the supply of the tissues of the extremity. In some instances the proportion of blood which does not pass through the fistula is so small that gangrene of the extremity develops spontaneously.

The successful treatment of arteriovenous fistula depends upon the choice of a method which will prevent a large amount of arterial blood gaining ready access to a vein and which will not dangerously diminish the amount of blood supplied to the tissues of the extremity. It is important to emphasize that too frequently treatment has been undertaken with the idea in mind of diminishing the flow of blood through the fistula without taking into consideration the fact that the technic employed also diminishes proportionately more the flow of blood which does not pass through the fistula. The blood which passes through the fistula into the vein is responsible for the cardiac manifestations of arteriovenous fistula, but the blood which does not pass through the fistula is that on which the vitality of the extremity depends. Furthermore, it is to be emphasized that blood vessels are not tubes with a permanently fixed capacity. A vessel so small as to transmit a relatively insignificant volume flow of blood may in the course of time change into one sufficiently large to transmit a very large volume of blood. This fact is responsible for the large number of instances in which the immediate effect of treatment is apparently successful and in which in the course of time all of the manifestations of the disease reappear. There is still another important fact to be mentioned. The only method of certain obliteration of a blood vessel is its complete extirpation. One can never be sure of obliteration of a blood vessel by simple ligature even at the site ligated and even more uncertain is the obliteration of any considerable length of a vessel by multiple ligatures.

In general, it may be said that the methods of operative treatment of arteriovenous fistula fall into two groups: those which are planned for the reduction in the flow of blood through the artery in the vicinity of the fistulous opening and those in which the purpose is only the prevention of the flow of blood through the fistulous opening. This may seem a distinction without a difference, but in reality the difference is great and the distinction is important. The essential of the technic of prevention of blood flowing through the artery in the vicinity of the fistulous opening is the application of the principle of ligature in continuity. The essential of the technic employed for the prevention of the flow of blood through the fistulous tract is the direct attempt to eradicate completely the fistulous opening. The technic of ligature in continuity has been applied in two ways. One method consists in the application of the ligature or of ligatures at a point proximate and more or less remote. This technic is conventionally known as the Hunterian operation. The other technic of application of ligature in continuity involves the application of a ligature or ligatures in the immediate vicinity of the fistulous opening. From an analogy to the operation for arterial aneurysm, this is sometimes spoken of as the Anel or Brasedor method. The methods directed solely at the closure of the fistulous opening between the artery and the vein differ from each other only in so far as a restoration of the normal continuity of the artery is or is not attempted. In one method both the artery and the vein are ligated proximally and distally to the fistulous opening and a segment of the two vessels containing the fistulous opening is extirpated. A similar method consists in the separation of the artery and vein at the site of fistulous communication and the restoration of one or both vessels by some sort of blood vessel suture. The conditions associated with each of these methods will be briefly discussed.

TREATMENT OF ARTERIOVENOUS FISTULA BY LIGATION IN CONTINUITY

In general, it may be said that attempts to cure arteriovenous fistula by ligation of vessels in continuity are unsatisfactory and in an amazingly large proportion of instances in which this method has been used the results have been disastrous. Ligation of vessels in continuity can only result in the obliteration of the fistulous communication between the artery and vein either by causing thrombus formation in the aneurysmal varix sufficient to block the fistulous communication, or by the application of a sufficient number of ligatures to isolate completely

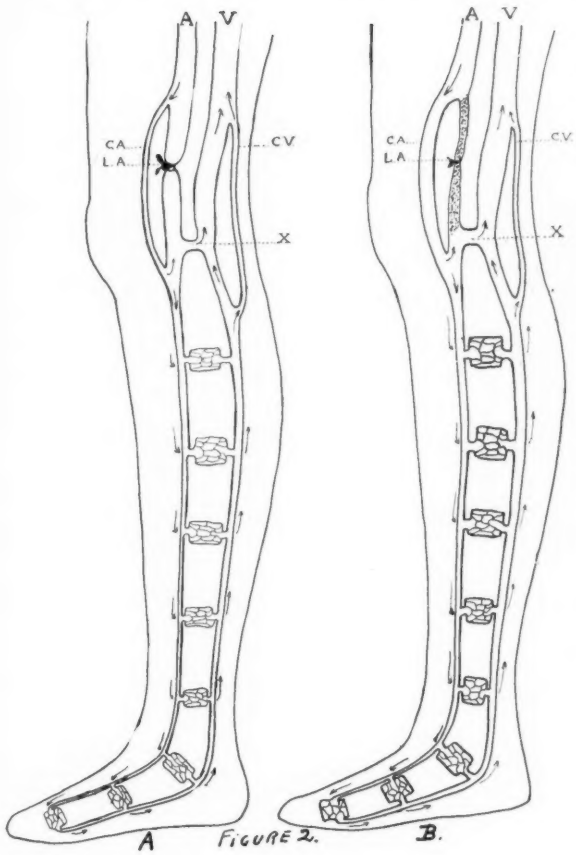

FIGURE 2.

the arteriovenous fistula from the circulatory system. Under any other conditions the fistulous opening remains patent and the operative procedure either results in immediate gangrene, no beneficial results or in subsequent recurrence of the disease. The least satisfactory and by far the most dangerous procedure is the performance of the Hunterian operation in which a single proximal ligature is applied at some distance from the arteriovenous fistula.

The result of the application of the Hunterian operation for the cure of an arteriovenous fistula is illustrated in *Figs. 2a* and *2b*. After the primary artery is obstructed by a ligature applied proximal to the fistula, the only blood which can reach the extremity must come by way of the paths of collateral arterial circulation. Since the distal aspect of the collateral circulatory arch must communicate with the fistulous opening, it is obvious that at least a part of the blood flowing through the collateral arterial paths will pass through the fistulous opening. The resistance offered to the passage of arterial blood through the fistula into the vein has not at all been influenced by the application of the ligature. It follows, therefore, that the application of the ligature can result only in a diminution of the total amount of blood reaching the tissues and the fistula. In a large proportion of instances in which this procedure has been carried out, the diminution in the flow of blood to the tissues has been sufficient to produce gangrene. *Fig. 2b* illustrates the changes which follow the Hunterian operation, the result of which is a reappearance of all of the manifestations of the arteriovenous fistula. It will be noted that the path of collateral arterial circulation has increased to such an extent that approximately the same conditions which existed before ligature of the artery have reappeared. In instances in which arteriovenous fistula has persisted for a long period, the capacity of the collateral anastomotic channels may be so large that ligation of the primary artery has even a relatively small immediate effect.

In the method of treatment of arteriovenous fistula by multiple ligatures, particularly ligatures applied in the immediate vicinity of the fistulous opening, there is less chance of inducing gangrene and more chance of permanent obliteration of arteriovenous communication than in the method of the single proximal ligature. It is obvious if the artery in the vicinity of the fistulous opening is isolated from all other arteries, or if the corresponding segment of the vein is isolated from all other veins, the fistulous opening is effectively closed. If a single small artery communicates with the supposed isolated fistulous segment of the artery, the manifestations of arteriovenous fistula will recur unless the segment of the vein with the fistulous opening is completely isolated from all other veins. In general, then, it may be said that the chance

of cure of an arteriovenous fistula is greater and the chance of gangrene less in proportion to the effectiveness of the ligatures in isolating the fistulous opening from the general circulation, and if this method is to be used the more vessels in the immediate proximity of the fistulous opening which are ligated, the less chance there is for gangrene and the more chance for cure. It is to be emphasized here, however, if the segments of the vessels containing the arteriovenous fistula are sufficiently well isolated to make it certain that the ligatures have effectively closed the communication between the artery and vein, then the vessels are in such a condition as to make the additional step of extirpation or direct closure of the fistula a procedure too simple to be omitted. Any artery and vein communicating with the fistulous opening will certainly divert a part of the collateral circulation through the fistulous opening. If the artery and vein are small, the immediate effect of the application of multiple ligatures may be favorable, but in time these vessels will enlarge and the original condition will return. It must also be remembered that blood vessels are not always obliterated even at the site of ligature, as has been demonstrated by the experiments of Horsley.

The result of the application of multiple ligatures in the immediate vicinity of an arteriovenous fistula is shown in *Figs. 3a* and *3b*. In *Fig. 3a* it will be noted that, although ligatures are applied to the artery and vein, both proximally and distally to the fistulous opening, a small artery and a small vein arising between the ligatures is unobliterated. Under such conditions, it is obvious that arterial blood derived from the collateral arterial branches may pass through the fistula. *Fig. 3b* shows the result of the subsequent enlargement of these small channels and a consequent recurrence of the manifestations of the arteriovenous fistula. If the application of multiple ligatures results in a complete isolation of the arteriovenous fistula from the circulation, then the conditions are the same as those represented in *Figs. 4a* and *4b*.

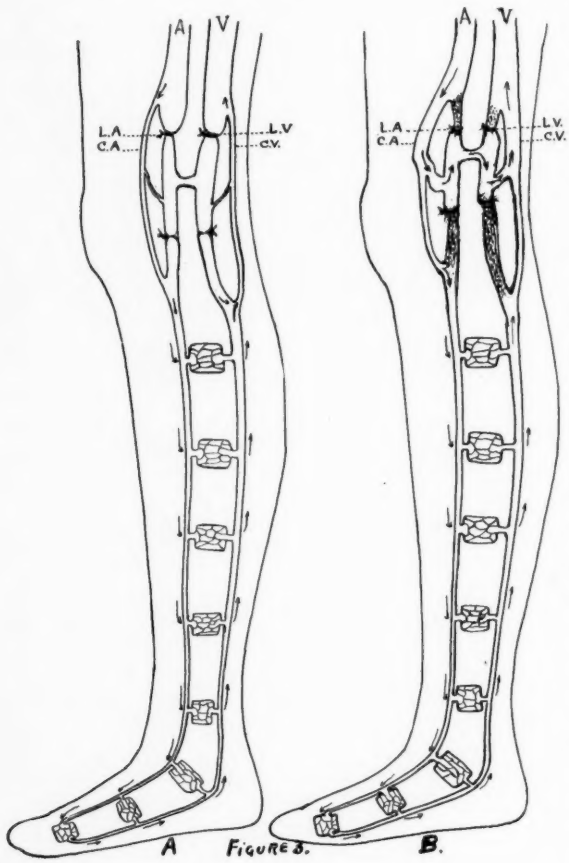

FIGURE 3.

TREATMENT OF ARTERIOVENOUS FISTULA BY CLOSURE OF FISTULA

In general, the technic of an operative procedure, the intention of which is the closure of the fistulous opening between the artery and vein, is more difficult and often a much more formidable surgical operation, but only by the choice of such a procedure can one obtain satisfactory results as concerns the recurrence of the pre-operative condition. Even more important, there is the least chance of death of the tissues supplied by the wounded vessels. It is obvious that the ideal procedure is the closure of the fistulous opening and the restoration of continuity of both the artery and the vein. It is not always

possible to carry out this ideal procedure and the records of all reported operations for the cure of arteriovenous fistula show such universally good results to follow the extirpation of the segments of vessels containing the fistulous opening that it is perhaps the best method to be used by those not particularly skilled in blood vessel suture.

The result of extirpation of the fistulous tract is shown in *Figs. 4a* and *4b*. In *Fig. 4a* it is clear that all of the blood passing through the collateral anastomotic channels will reach the tissues. As has been emphasized by Reid, arteriovenous fistula is seemingly a condition which is particularly productive of an abundant collateral circulation. The fact that gangrene has not been found to follow extirpation of arteriovenous fistula is evidence for the truth of this statement. *Fig. 4b* illustrates the restoration of the normal circulation by the enlargement of the paths of collateral circulation after complete obliteration of the primary vessels by extirpation of the fistula.

Fig. 5 illustrates the conditions associated with the technic of closure of the arteriovenous fistula and restoration of continuity of the artery or both the artery and vein, although restoration of the continuity of both vessels would, I believe, be considered the ideal operative technic. In most instances of arteriovenous fistula, obliteration of the vein is not to be considered as serious. As has been pointed out elsewhere in this paper, it would not seem as if obliteration of the vein were to be considered a desirable procedure.

In conclusion, then, it may be said that any successful operative method for the cure of arteriovenous fistula must have as its primary object the closure of the fistulous opening and not the limitation of the flow of blood through the segment of the artery containing the fistula. There are some instances of arteriovenous fistula in which our present operative technic does not permit the application of this ideal method, but until it is possible to carry it out, results in these cases will be unsatisfactory. I refer particularly to intracranial arteriovenous communications. In other parts of the body, and particularly in the extremities, closure of an arteriovenous fistula is not a very difficult procedure if appropriate preliminary control of the blood supply is instituted and the operator has even average technical ability.

There are several other interesting problems concerning the most appropriate treatment of arteriovenous fistula which time does not permit me to discuss at length. I feel that needless emphasis has been placed upon at least two ideas mentioned in almost all recent papers on this subject. It has been emphasized that a considerable time should be allowed to elapse

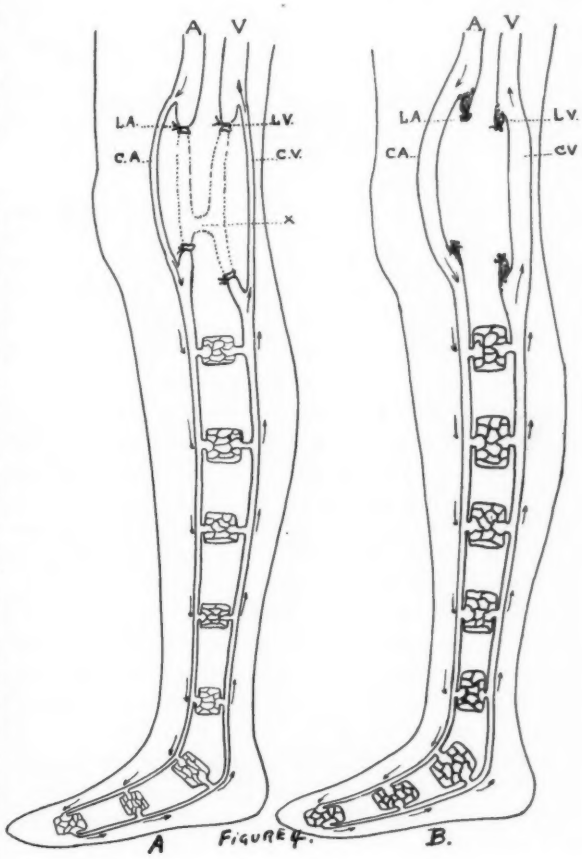

FIGURE 4.

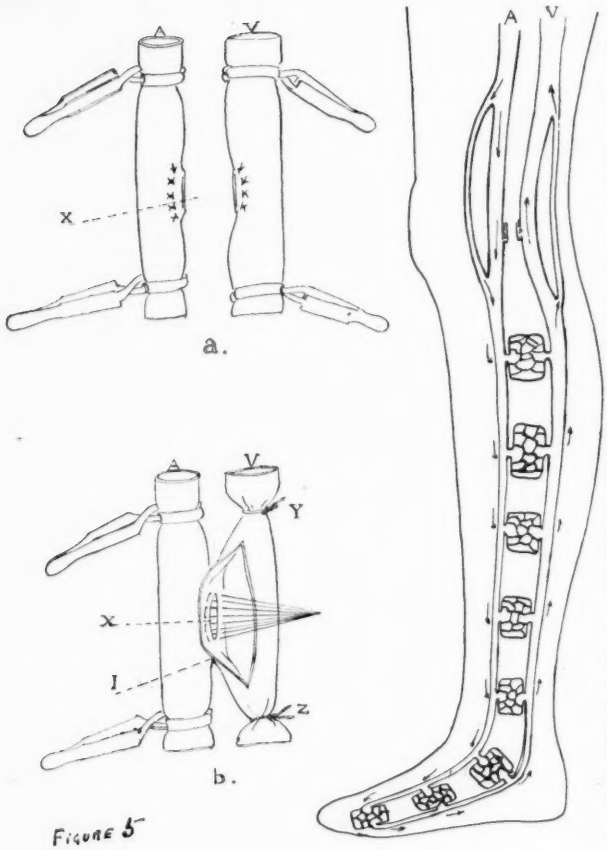

FIGURE 5

between the establishment of an arteriovenous fistula and the institution of the operative treatment. The reason usually assigned for this delay is that it gives an opportunity for the development of collateral circulation. I am inclined to believe that in any given instance in which arteriovenous communication does not result in gangrene during the relatively brief period which it is usually necessary to delay operation on account of sepsis, there is sufficient collateral circulation to permit of complete obstruction of the artery at the site of the fistulous opening. In other words, I believe that the diminution in the circulation to the parts supplied by the wounded artery is greater because of the existent fistula than it would be if the artery were completely obstructed at the site of the fistula. Certainly the technical difficulties associated with early operation for arteriovenous fistula are not so great as that encountered in operations undertaken only after the development of the large mass of dilated thin walled vessels. Another idea upon which I believe undue emphasis has been placed is that of the necessity of occluding the vein concerned in the arteriovenous fistula. I believe the occlusion of the vein in operations for the cure of arteriovenous fistula has, in most instances, been due to the fact that the venous occlusion resulted in an isolation of the fistulous opening from the general circulation rather than because of its beneficial effects as regards arterial occlusion. In other words, I believe if the arteriovenous fistula can be successfully closed without occlusion of the vein, there is no evidence that ligation of the vein should be superadded. In instances of arteriovenous fistula which have existed for a considerable period of time, there is a very abundant collateral arterial circulation. In such instances, even though the artery may be completely blocked at the site of the fistulous opening, the ligature of the vein is not to be recommended. In such instances the volume flow of blood through the tissues distal to the fistulous opening may be actually markedly increased even though the primary artery is completely occluded at the site of the fistula. Under such conditions it would certainly seem unwise to diminish the capacity of the venous return. The only indication, I believe, for intentionally obstructing the vein in the operative treatment of arteriovenous fistula is that this step is necessary for the satisfactory closure of the fistula, or possibly the vein is so injured that postoperative thrombosis and embolism might occur.

ETIOLOGY OF ACUTE INTESTINAL INTOXICATION OF INFANTS: PRELIMINARY REPORT*

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Acute intestinal intoxication, sometimes designated as cholera infantum or acute fermentative diarrhea, is a distinct clinical entity. The condition is characterized by three cardinal signs and symptoms, namely: diarrhea, vomiting and drowsiness. The disease occurs chiefly in infants from two to twelve months of age, although occasionally it is seen during the second year of life and even later. It is encountered sporadically throughout the year, but in Canada and the northern part of the United States it occurs in epidemic form during the months of August, September and October.

The history usually obtained is that the illness starts with diarrhea. In some instances the diarrhea is followed in 24 to 48 hours by drowsiness. The vomiting occurs two to ten times a day. The stools, which are five to ten a day, are loose and watery and sometimes contain mucus, but not the pus and blood seen so frequently in dysentery. The degree of drowsiness varies even in the same infant. In the mild and moderately severe cases the infant may appear quite bright when aroused. Even the disturbance produced by undressing the infant may be sufficient to dispel any evidences of drowsiness. For this reason the patient should be carefully observed before being disturbed in any way. When roused the infant has a shrill, piercing cry, although in the severe cases the cry may be only a weak moan. The temperature rarely exceeds 102 or 103° F. The color of the skin is ashen gray, the eyes are sunken, the hands and feet are cold and clammy and either cyanosed or gray in color. Dehydration is invariably present, as shown by loss of elasticity of the skin. The liver is usually enlarged. In many instances infections of the upper respiratory tract, including the ears and mastoids, are encountered.

The condition occurs not only in the undernourished marantic infant with a history of previous gastro-intestinal disturbances, but likewise in infants of normal weight with no history of previous trouble. It is a disease chiefly of the free dispensary class, being rarely encountered in well-to-do families, although we have seen an occasional case in this latter group.

The course of the disease may be very rapid, some infants dying within 24 to 48 hours of the onset of drowsiness in spite of any treatment employed. In other cases the drowsiness disappears and the vomiting ceases within 24 hours of the institution of treatment and the infants make an uneventful and usually rapid recovery. The remaining patients continue to vomit slightly and are drowsy for many days before they make the turn one way or the other. The mortality in the severe cases is very high, being well over 50 per cent. This is irrespective of the previous nutrition of the infant. In fact, the large, rather fat infant frequently shows the least resistance to the disease.

Pathological findings recorded have given little help as to the etiology of the condition. In the majority of instances the gastro-intestinal tract appeared normal except for a fatty liver observed in about 75 per cent of cases. The mastoid antra in many cases have been found to be full of pus. However, no consistent pathological changes have been recorded.

Many theories have been advanced in recent years as to the etiology of acute intestinal intoxication, such as: (1) the production of some toxic substance from the food by decomposition; (2) improper foods; (3) infection of the intestinal wall with bacteria; or (4) abnormal absorption of catabolites from the bowel. Numerous bacteriological researches have failed to reveal a pathognomonic organism. Mellanby, in 1915, suggested the possibility of an amine base, which could readily be formed from histidine, a non-toxic substance found normally in the bowel. He produced comparable symptoms in animals by injecting beta-amino-adzalethylamine into their gastro-intestinal tracts. In 1923, Gladys Boyd in our Clinic obtained a circulating toxin which she thought was produced in the mucous membrane of the bowel. Chemically the substance resembles closely an amine base, and possibly is the normal toxic

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substance found by Starling in bowel mucous membrane; it was not determined whether the symptoms were due to an over-production or increased absorption of this substance. At that time it was felt that numerous organisms might play a secondary role in producing the poison by converting a harmless protein split product from an acid to a toxic base substance.

A recent theory, however, advanced by Dean, Marriott, Jean and Floyd and others has provoked a great deal of discussion. These investigators believe that the condition is caused by an upper respiratory infection involving the throat, ears, mastoid and sometimes the paranasal sinuses. These writers record many infants who have made spectacular recoveries after the mastoids were opened and drained and they believe that the toxins absorbed from these foci of infection produce the intestinal symptoms.

For the past seven years we have been particularly interested in certain aspects of acute intestinal intoxication. Some eighteen months ago we planned a comprehensive investigation of infants suffering from this disease, which investigation has been in progress since that time. In view of the possible importance of upper respiratory infections it was realized that no investigation would be complete without carefully controlled observations of the upper respiratory tract. One of us (D. E. S. Wishart, of the nose and throat department) has undertaken this part of the investigation. The clinical and chemical observations have been made by Alan Brown, F. F. Tisdall and T. G. H. Drake, while M. M. Johnston has conducted the bacteriological examination of the blood, stools, urine and upper respiratory tract as well as serological tests. More recently P. Summerfedlt, G. Ormiston and C. Snelling have studied the blood volume, the capillary blood flow and the sugar tolerance of these infants. It was hoped by making a comprehensive study of the various aspects of the disease over a long period that we should obtain sufficient information to add materially to our rather meager knowledge of the disease. The present paper is entirely in the nature of a preliminary report and only the points of general interest will be discussed.

From September, 1928, until July 1, 1929, 43 cases of acute intestinal intoxication and 36 control cases were studied very completely.

Clinical Investigation.—The clinical course of all cases was followed very closely. It is not necessary to repeat here the well-recognized signs and symptoms of the disease already enumerated in the preceding paragraphs. The 43 cases of acute intestinal intoxication were divided into two main groups: first, those in which the initial symptoms were diarrhea and vomiting, and second those in which the initial symptoms were preceded by a cold. There were 27 in the former group and 14 in the latter group. In addition there was a third small group of two infants, both of whom had pyelitis with vomiting, diarrhea and marked drowsiness.

The nose and throat examination consisted in the investigation of the ears, nose and throat, and in addition the examination of the nasopharynx with the nasopharyngoscope. At the same time cultures were made of the throat, back of the nose and of the ears. Repeated examinations were made in the same infant. Of these 43 infants all but eight developed otitis media at some period during the course of the disease. The ear infection in many was the ordinary typical acute otitis media. In the more severe cases, however, the otitis media was frequently atypical. The drum would become dull with a faint light reflex and a visible malleus, but with a slight bulge of the postero-superior quadrant. Incision of this bulge resulted in the escape of a drop of slightly cloudy serum which, after a varying period, developed ordinary typical mastoiditis. In almost every case infection of the naso-pharyngeal tissues occurred at some period during the course of the disease, but in many cases the toxicity was present for some days before there was any evidence of involvement of the nasopharynx.

Of the 27 infants in whom the initial symptoms were diarrhea and vomiting, 13 were males and 14 were females. Twenty-one of these were bottle-fed, three cases were on soft diet and one breast-fed with a supplemental feeding. In two infants the feeding history was unknown. Of the 14 infants in whom the intestinal symptoms were preceded by a cold, five were males and nine were females. The feeding history was unknown in two infants, while the remaining 12 were bottle-fed. Thus in no instance of the 41 cases did the disease develop in an exclusively breast-fed infant. However, of the two infants with pyelitis who developed symptoms of acute intestinal intoxication, one was breast-fed exclusively. Of the 41 infants, 17 died and 24 recovered. Both infants with pyelitis recovered.

Autopsies were performed on five of the 17 infants who died. In three there was no mastoid infection. In the other two, infection was found in the antrum or only in its immediate periphery with no involvement of the greater part of the mastoid itself. There was no evidence that death in any of these five cases was the result of a focus of infection in the mastoid. In fact, in only one of the 41 infants with acute in-

testinal intoxication was an infection in the upper respiratory tract the only discovered etiological factor.

Blood Chemistry Investigation.—No attempt will be made to give a detailed account of the relation between the acid and basic substances in the blood in infants with acute intestinal intoxication.

In diarrhea there is a large loss of the alkaline intestinal secretions. This results in the withdrawal from the blood and tissues of a large amount of basic substances, largely sodium without a corresponding withdrawal of acids. It is obvious that this will tend to produce a condition of acidosis in the body tissues. On the other hand, with vomiting there is a loss of acid gastric secretions which tends to produce a condition of alkalosis in the body tissues. In every case of acute intestinal intoxication in which we have determined the acid-base equilibrium we have found an acidosis varying from a mild to a severe degree. This shows that the loss of the alkaline intestinal secretions predominates over that of the acid gastric secretions.

C. E. Snelling has confirmed the earlier observations of Tisdall, Drake and Brown that in acute intestinal intoxication the ability of the body to remove injected carbohydrates from the blood stream is diminished. Snelling also has found that as the clinical condition of the patient improves the injected carbohydrate is removed more rapidly and as the clinical condition becomes worse the removal of injected carbohydrate becomes slower. G. Ormiston has found a marked diminution of the blood flow in the peripheral capillaries. These as well as other observations made in these laboratories indicate that the toxemia interferes with the function of probably all the body cells.

Bacteriological Investigation.—Only the general outline of the bacteriological procedure is given here. Throat swabs were taken in the majority of cases. Nasopharyngeal swabs were obtained by means of a very thin applicator, which was wrapped with cotton and passed through a metal cannula to the back of the infant's nose in order to secure material already there or coming from the eustachian tube. The applicator was then withdrawn through the metal cannula and in this manner was uncontaminated by secretion and bacteria in the outer nares. Whenever the ears were opened cultures were made in the usual manner. Stool cultures were obtained by means of rectal swabs.

Of the 27 infants in whom the initial symptoms were diarrhea and vomiting, throat cultures were taken in 20 and hemolytic streptococci found in 13 of these. Of the 13 nose cultures, nine yielded hemolytic streptococci and of seven ear cultures, five yielded hemolytic streptococci. Thus in the large majority of patients hemolytic streptococci were found in the ears, nose or throat. Positive stool cultures, containing microorganisms of possible pathogenic nature, were found in 23 of the 27 infants. The organisms isolated were *B. dysentery Sonne, B. paratyphosus B, B. paracoli, B. morgani, Proteus vulgaris, B. pyocyaneus, B. paradiffluens, B. diffluens* and unknown gram-negative bacilli. In some cases only one type of bacterium was recovered, while in others two or more were isolated.

Of the 14 infants in which the intestinal symptoms were preceded by a cold, throat cultures were taken in 13, and hemolytic streptococci found in ten of these. Of five nose cultures, two yielded hemolytic streptococci, and of seven ear cultures, four yielded hemolytic streptococci. Again in the majority of the cases hemolytic streptococci were found in the ears, nose or throat. Positive stool cultures were found in eleven of these fourteen infants. The organisms were the same as those enumerated in the preceding paragraph. The wide variety of species identified has also been reported by Dick, Dick and Williams[1] and Wilson.[2]

Stool cultures were made from the two infants with pyelitis and vomiting, diarrhea and drowsiness. *B. morgani, B. paradiffluens* and *Proteus vulgaris* were isolated in one infant. Negative results were obtained with the other infant. Blood cultures which were done in 50 per cent of the cases gave positive results in only two infants, *Bacillus paracolon* being recovered in both instances.

A series of 36 control cases was studied. These infants were patients in the wards suffering from conditions other than acute intestinal intoxication. Nine of these had clinical mastoiditis. Cultures of the throat were made in 35 patients and hemolytic streptococci found in 27. Of twelve ear cultures, six yielded hemolytic streptococci, and of ten nose cultures four yielded hemolytic streptococci. Again, as with the infants suffering from acute intestinal intoxication, hemolytic streptococci were found in the majority of patients. Stool cultures were obtained from the 36 infants and significant cultures isolated from 14 of these. The same organisms were isolated as were found in the infants with acute intestinal intoxication, except that *B. dysentery Sonne* was not found in any of the control cases.

Agglutination Reactions.—The sera of 23 infants with acute intestinal intoxication were tested for agglutination against the possible pathogenic organisms found in the stools. Positive agglutination was found in one case with *B. morgani,* in one case with *B. paratyphosus B,* in two cases with *B. dysenteriae Sonne,* and in 19 cases with *B. paracoli.* When agglutination was obtained with one bacterium, no agglutination occurred when the same serum was tested with any other bacterium. Also, the organism against which agglutinins had been developed in the serum was not always recovered from the stool.

The sera of only four control infants have been tested so far. Positive agglutination was obtained in only one of these.

Etiology of Acute Intestinal Intoxication.—Various investigators have reported the finding of a focus of infection in the mastoids of infants who have died of acute intestinal intoxication. They, therefore, advise that such foci should be drained, and they have reported very favorable results from this operation.

Following this suggestion we operated upon both mastoids of a series of 13 infants with acute intestinal intoxication in 1927, following the technic outlined by Dean and Marriott. These cases were all severely toxic with no clinical evidence of mastoiditis. Purulent material was found in the antra of nine of these 13 infants. There was evidence of infection in the mastoid cells in only six. In these nine infants practically no improvement was noted following operation and eventually only one recovered. In a number of these nine the mastoid wound healed satisfactorily before death. In no case did we feel that the mastoid operation hastened death. We believe that this constitutes considerable evidence in favor of the view that the mastoid infection was not the cause of the toxemia.

In the present series hemolytic streptococci were found in the throats of 74 per cent of the control infants and in the throats of 70 per cent of those suffering from acute intestinal intoxication. The streptococci were recovered from the ears, nose or throat of not only the infants who died, but also of those who recovered. In cases of severe intestinal intoxication occurring late this summer and not included in the present series, no streptococci were found at any examination during the course of the disease in spite of the fact that many of the infants died.

We believe that this proves conclusively that hemolytic streptococcal infection in the ears, nose or throat is not the etiological factor in acute intestinal intoxication.

The records of 145 cases of clinical mastoiditis in infants under two years of age were carefully analyzed. Of these only 30 showed any evidence of diarrhea, vomiting or toxemia and it was rare to find any two of these symptoms in one infant. These figures bear out the impression of every one that clinical mastoiditis does not produce the symptoms of acute intestinal intoxication.

In regard to stool cultures, micro-organisms of possible pathogenic importance were found in 34, or 80 per cent, of the 41 cases of acute intestinal intoxication and also in 14, or 38 per cent, of the 36 control cases. It is well known that different strains of the same organism vary in virulence.[3] Virulence tests are now being performed on the isolated organisms. Although at the present time we are not prepared to state that these organisms are the etiological factor, yet the fact that agglutination occurred in such a large number of cases and in high dilution makes it more than possible that they have etiological importance.

Baby Shirley Maybee, six months old, had had a cold in the head for two weeks prior to her admission to the hospital. She had been vomiting for one week, and had had loose green stools for one and one-half weeks. She had also had fever. On admission her ears were normal.

Death occurred on the twenty-ninth day after admission. Autopsy showed the middle ears and mastoid antra to be perfectly normal and cultures taken at autopsy were sterile.

Stool culture yielded *B. morgani*. Blood culture was sterile.

Agglutination was negative using *B. morgani*, but positive to 1 in 160 using *B. paratyphosus B.*

As yet we have not developed any specfic treatment for this condition. Our present treatment is based on the following fundamental principles:

(1) Replacement of water loss.

(2) Replacement of salt loss.

(3) Administration of food for energy in a form which will not aggravate the toxemia.

(4) Administration of glucose.

(a) To prevent the development of ketone bodies.

(b) To act as a detoxicating agent.

(5) Transfusion of blood to supply fluids, salts, food energy and other substances at present unknown.

The water loss as shown clinically by dehydration and loss of elasticity of the skin is one of the important factors which aggravate the initial toxemia. In fact, we have produced in animals by dehydration alone a picture which cannot be distinguished from that of acute intestinal intoxication. On account of the vomiting and diarrhea, practically all the fluid required must be supplied at the beginning by routes other than the gastro-intestinal tract. Fluids are given subcutaneously, intravenously and intraperitoneally. Of course, as vomiting subsides, fluids are retained when administered in small amounts by mouth. The rectal route is of little value for the administration of fluids to infants at any time.

In order to retain the required fluids and also to replace salts lost, it is essential to administer salts. Our blood analyses have shown that the principal requirements are sodium and chlorin. We do not know the exact concentration of these salts required by the body. If there is sufficient water available for kidney function the body can pick and choose the required salts. Hence

it is absolutely essential to administer separately from the salt solution sufficient glucose solution to keep the kidney functioning. The glucose is burned by the body and leaves the water available for excretion of the unwanted salts which, if allowed to accumulate in the body, would in themselves exert a toxic influence.

The routine treatment for acute intestinal intoxication administered in this clinic is the following: the subcutaneous administration of fluid is started immediately after admission. We are usually able to give three subcutaneous injections of approximately 10 c. c. of fluid per pound of body weight in the first 24 hours. These injections are of normal saline or preferably a Ringer's solution alternated with 5 per cent glucose solution. After the first day absorption will not be so rapid and two subcutaneous injections per 24 hours are usually all that can be absorbed. As dehydration becomes less this is reduced to one injection per day and is continued as long as there is need for additional fluids.

In practically every case it is necessary to supplement the subcutaneous injections by fluid administered intraperitoneally or intravenously, and frequently it is necessary to administer fluid by all three routes. Intraperitoneally we give only a saline solution on account of the possibility of irritation and distention when glucose solution is used. The amount given is 10 to 15 c. c. per pound of body weight. Intravenously either saline or glucose may be used, 15 c. c. per pound of body weight. We practically always use the superior longitudinal sinus for intravenous injections of these substances and have no ill effects to report. If one is unskilled in the technic of fontanelle puncture, we believe that intraperitoneally injections are easier and safer. By mouth, 15 per cent sugar solutions, half cane sugar and half dextri-maltose, and a sodium citrate, orange juice and glucose solution have been administered. We feel that the 1 per cent sodium citrate solution one part, orange juice two parts and 10 per cent glucose three parts is slightly preferable. The infants will take a slightly larger amount of this solution. In addition, when sodium citrate is administered the citrate portion will be metabolized, leaving the basic sodium to repair the acidosis. The solution is administered in small amounts, approximately one to one and a half ounces at hourly intervals. Should vomiting occur the stomach is lavaged with sodium bicarbonate solution a teaspoonful to the pint of water and after a space of one or two hours administration of the fluid is again started.

No milk or other food is added to the diet until all symptoms of toxicity have been absent for one or two days. We have kept many infants on the preceding milk-free routine for a period of two to three weeks with a weight loss of only a few ounces. It should be remembered that the caloric value of the citrate, orange juice and glucose solution is ten calories to the ounce, or as much as half strength milk.

It is not beyond the bounds of possibility that as a result of our present bacteriological investigation we may succeed in evolving a specific vaccine or serum of value in the treatment of infants suffering from acute intestinal intoxication.

CONCLUSIONS

(1) We believe that the etiological factor in acute intestinal intoxication is not an upper respiratory infection.

(2) Various micro-organisms of possible pathogenic importance have been isolated in the gastro-intestinal tract against some of which agglutinins have been demonstrated in high dilution of the patients' sera.

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DISCUSSION (*Abstract*)

Dr. William Weston, Columbia, S. C.—I do not think that we American physicians ought to permit to go unchallenged the very widespread belief that all these cases are subjects for mastoid operations and that that is the proper form of treatment. I started out somewhat with that idea myself, after having heard a certain distinguished gentleman on the subject, and my experience was rather disastrous. I hope that Dr. Brown will solve this very serious problem by ascertaining the organism that is responsible.

Dr. John Zahorsky, St. Louis, Mo.—If you will study the stools under the microscope daily you will find that during the acute stage of intoxication they do not contain many cells, which would indicate that there is not a very strong reaction of the intestinal mucosa. If you follow that from day to day, however, if the child recovers or has a tendency to recover, there is a gradual increase in the cellular contents of the stools. In my own practice I have adopted this as a way of telling whether the child will recover. You cannot tell it by looking at the stools macroscopically; you have to look at them under the microscope. You will find that the child that will ultimately recover will discharge an enormous number of pus cells. The primary and principal

lesion is in the intestine and not in the ear and not in the throat. I had a patient recently, for example, who had a typical case of gastro-intestinal intoxication. We took great pains to study his ear and mastoid. The child did have some congestion in the ear drum for a while. All babies that lie constantly on the back, it does not matter what is the nature of the illness, especially in a hospital, will sooner or later have an otitis media. The child that is in the home and is carried around by the mother in an upright position so that the vomitus is disposed of promptly, will have less ear trouble.

THE PROGNOSIS AND TREATMENT OF LOBAR PNEUMONIA*

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The average mortality of lobar pneumonia in adults ranges from 10 to 25 per cent. I know there are some physicians who are said never to have lost a case and there are others who are so pessimistic that they believe that there are only two types of pneumonia: one that recovers and one that dies. I am particularly interested in trying to recognize with more certainty at the onset of the disease the one individual in five or six who seems likely to die and to see in what way his fate may be altered by therapy.

Many factors enter into the prognosis: experience, judgment, history of the case, physical signs, all of which are important. But I wish to point out here the influence of the particular type of pneumococcus infection, and its presence in the blood stream.

As you will see from these statistical studies, the pneumococcus types II and III, which have the largest capsules, in general, cause the highest mortality. Considering Dr. Cole's series of cases from the Hospital of the Rockefeller Institute, in 249 cases of type II, the mortality was 28.5 per cent, and in 123 cases of type III the mortality was 43 per cent. Turning to my smaller group of cases, most of which were seen in consultation, of 29 cases of type II, 52 per cent died and in 48 cases of type III, 54 per cent died.

It is believed that the capsular material elaborated by the pneumococcus has something to do with protecting the bacteria from the antibodies of the host. Type IV frequently has no capsules at all and, as you see, of 273 cases in Dr. Cole's series only 12.8 per cent died, while in 93 cases in my series only 19 per cent died. For that reason sometimes just a glance at the direct smear of the patient's sputum gives one an inkling of what is to transpire.

It is said that type I pneumococcus infections are usually mild. Turning to Dr. Cole's series, one sees that in 431 cases of type I, the mortality was 10.2 per cent, but most of these cases were treated with serum. The average hospital mortality of type I cases not treated with serum is about 25 per cent. In my group of 78 cases, most of whom, to be sure, had more severe cases than the average, although 52 were serum treated, the mortality was 28 per cent. I think this proves conclusively that type I infections can be serious.

There is another sign that is more indicative of a grave prognosis than the type of infection, and that is the presence of a bacteremia. About 38 per cent of Dr. Cole's series had positive blood cultures. In this group of 70 cases of type I infection, 63 per cent had positive blood cultures. Of 21 cases of type II, 52 per cent were positive. Now, if one notes the relation of mortality to positive blood cultures, one can readily see the significance.

No. Cases	Type	Culture	Mortality
44	I	positive	39%
11	II	positive	91%
10	III	positive	90%
6	IV	positive	83%
26	I	negative	11%
10	II	negative	33%
17	III	negative	41%
49	IV	negative	10%

Although this is a small series of cases, the influence of the bacteremia on the prognosis is very striking. Ordinarily one thinks of type IV infections as mild, and in general they are mild, for they are rarely accompanied by a bacteremia. But when it is present, they are just as serious as infections due to other types. These figures show indirectly the beneficial effect of serum therapy. For it is only in that group of cases, many of which were treated with serum, that a relatively lower mortality in the presence of a bacteremia is shown.

If a case is found to have a positive blood culture at the onset of the disease, it usually means a severe battle. I have never seen a pneumonia with a positive blood culture that recovered in two or three days unless serum therapy was used. Positive blood culture cases run a course of more than average duration if death does not overtake them. It is surprising

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how many show positive blood cultures from the onset. I have repeatedly obtained positive blood cultures from patients who did not look very ill.

Although the pneumococcus is the infecting agent in 95 per cent of cases of lobar pneumonia, it is often difficult at the onset to know whether one is dealing with a broncho-pneumonia or a true lobar infection. The knowledge of the particular causative organism in each case may have a definite bearing on treatment. If the hemolytic streptococcus is present, one is extremely watchful for the early development of a purulent pleurisy and especially for the discovery of multiple or anterior pockets. With the *Staphylococcus aureus* one has the vision of multiple miliary abscesses in the lungs with the occasional coalescence of these abscesses into a pocket that may be drained.

GENERAL TREATMENT

In no disease is attention to details more important. Tactful nursing and complete rest and quiet for the patient are first requisites. If possible the patient should be kept flat in bed, changing the position frequently from side to side. A tight binder often relieves pain. If it does not, codeine or morphin should be used. The fluid intake and output should be carefully computed, trying to get in 100 ounces a day. A daily enema and no cathartics usually reduces distention to a minimum. Allow fluids or soft solids, as desired, but do not press nourishment. The medicinal treatment should be as simple as possible. Digitalis is probably not needed in the case of young adults, but it is often very useful for those who may develop fibrillation. Caffeine is helpful for the respiratory distress and codeine for the cough.

The use of oxygen is a great help in the presence of dyspnea and cyanosis. It lessens the effort of breathing when the respiratory reflex has begun to weaken and sometimes tides the patient over until his antibodies can come to the rescue. The introduction of oxygen by nasal catheter is occasionally effectual and its virtue is simplicity, but better still is the Barach oxygen tent. Best of all is the oxygen room such as the ones in use at the Rockefeller and Presbyterian Hospitals in New York.

SERUM THERAPY

Serum therapy for cases that need it is believed to be most beneficial. That does not mean that every individual suffering from pneumonia should be given serum before typing in the hope that he has a type I or II infection. I believe it is meddlesome therapy, and the delay of 12 to 18 hours, if the case is typed at the onset of the infection, is not serious. Moreover, it is a waste of very expensive therapeutic material which up to now has been difficult to obtain.

Then, too, sometimes thermal reactions follow the administration of serum which, although in my experience they have not been serious, still are alarming to the patient and relatives.

Of the first thirty cases seen last winter, only five would have been influenced by serum therapy, or 16.66 per cent. As a matter of fact, those five types I and II cases were subsequently treated and all recovered.

If typing is not insisted upon before therapy, it will be difficult to have it done at all, for human nature is frail and we take the easier course. If all cases are treated, the therapeutic results will be disappointing, as in this group of 30 cases 13 died, a mortality of 43 per cent.

The efficacy of serum for type I infections is more firmly established than for type II. In Dr. Cole's series of 431 cases, almost all of which were treated with serum, the mortality was 10.2 per cent. I know I shall soon hear the objection that this is not a controlled series, just as some one will rise with thirty years of clinical experience and tell me the mortality from pneumonia varies from year to year. But the mortality of type I pneumonia and type II pneumonia and type III pneumonia and type IV pneumonia for approximately the same age groups does not vary enough to cast much doubt on the wonderful results Dr. Cole has obtained in this quite large series of cases.

In my smaller series of 78 cases the gross mortality was 28 per cent.

Of 52 cases treated with serum, 23 per cent died.

Of 26 cases not treated with serum, 38 per cent died.

If one compares the cases with positive blood cultures, of 31 cases treated with serum, 26 per cent died.

Of 13 cases not treated with serum, 77 per cent died.

Dr. Bullowa, from the Harlem Hospital, New York City, reported the results of the serum

treatment of types I and II cases with positive blood cultures as follows:

Type	Treated No.	Treated Mort.	Untreated No.	Untreated Mort.
I	28	39%	22	81%
II	13	38%	17	75%

Although I have faith in the unconcentrated anti-pneumococcus serum for type I infections, one must admit that the administration of the serum in private practice has difficulties for the general practitioner. The technic may be learned, but it is time-consuming and thus is not popular. Then there is the bogy of serum sickness, which is unpleasant but not dangerous for the patient.

With the concentration of a polyvalent serum for types I and II by Felton's method, it is possible to obtain a product that is potent and easy to use.

If a sufficient amount of the polyvalent I and II serum is used for these infections, it has a definite curative value.

You will note that in my series of 11 cases of type II with positive blood cultures, ten died, no specific therapy having been available at that time. On the other hand, Dr. Horace Baldwin, at the New York Hospital, has treated 14 type II cases with positive blood cultures with the Felton serum with but five deaths. His remarkable results have not been due to chance, but to the very vigorous and intelligent use of large amounts of antibody. Our failure to obtain results with the unconcentrated type II serum in the past has been due to our inability to get large enough amounts of the immune substances into the patient when they were contained in the whole serum.

Up to the present time I have had the opportunity to treat only nine patients with the Felton anti-pneumococcus serum, with one death. The fatal case was treated the day the patient died. Four cases with positive blood cultures responded quickly to treatment.

The danger of anaphylactic reactions from the use of anti-pneumococcus serum is frequently stressed by opponents of serum therapy. It is true that there is a very real danger in the improper use of any immune horse serum. This applies as much to the use of anti-meningococcus serum and tetanus and diphtheria antitoxin. If a person is really sensitive to horse serum the 1 c. c. dose of tetanus antitoxin is sufficient to kill him. But there should be no fear if the intradermal skin test or the ophthalmic test is made to determine sensitiveness. This should always be done before giving even minute doses of horse serum under the skin. We will have many disastrous results if this preliminary intradermal test is not done in the years to come, since such a large proportion of the children now growing up have been immunized against diphtheria with the toxin-antitoxin mixture. For this purpose a toxoid preparation or one made with goat antitoxin should be used to avoid sensitizing children to horse serum.

If the preliminary test is negative, it is perfectly safe to start treatment with anti-pneumococcus serum either whole or concentrated according to Felton's method, as now placed on the market by Lederle.

I believe it is wise in private practice to begin with small doses intravenously, 1 c. c., increasing to 2 c. c., then 5 c. c., 10 c. c., 20 c. c., at frequent intervals if no thermal reaction develops, until the desired amount of antibodies or

LOBAR PNEUMONIA, HOSPITAL OF ROCKEFELLER INSTITUTE

Bacterial Incitant	No. Cases	Rec.	Died	Mort. %
Pneumococcus type I	431	387	44	10.2
Pneumococcus type I	249	178	71	28.5
Pneumococcus type IIa	62	49	13	20.9
Pneumococcus type III	123	70	53	43
Pneumococcus type IV	273	238	35	12.8
Undetermined	62	52	10	16.1
	1200	974	226	19.0

LOBAR PNEUMONIA CASES SEEN IN PRIVATE PRACTICE. CASES ON WHICH BLOOD CULTURES WERE TAKEN

	Total Cases		Blood Culture		Cases Pos.		Cases Ster.	
Type	Cases	Mort. %	No. Cases	% Positive	No.	Mort. %	No.	Mort. %
I	78	28	70	63	44	39	26	11.5
II	29	52	21	52	11	91	10	33
IIa	6	16.6	4	50	2	50	2	0
III	48	54.2	27	37	10	90	17	41
IV	93	19.4	55	11	6	83	49	10

TYPE I CASES WITH POSITIVE BLOOD CULTURES

Serum Treated		No Serum	
Cases	Mort.	Cases	Mort.
31	26%	13	77%

All type I cases treated with serum, 52; died, 12; mort., 23%.
All type I cases, no serum, 26; died, 10; mort., 38%.

MISCELLANEOUS CASES

Infecting Organism	No.	Mort.	Blood Culture %	Blood Culture Positive
B. influenzae	5	1	20	1
Hem. streptococcus	29	9	31	4
Strep. mucosus	1	1	100	0
Staphylococcus aureus	7	5	71	3
B. Friedlander	1	0	0	0
Miliary tuberculosis	2	2	100	0
B. paratyphosus	1	1	100	1
Undetermined	22	2	9	0

units are administered, which in severe cases means one or two hundred thousand units.

The solution of the problem of curing pneumonia is only begun. In some cases serum therapy has a very distinct place. If one can only discover these cases early in the disease, one may be able to reduce, in a measure, some of the mortality from this infection.

DISCUSSION (*Abstract*)

Dr. Tinsley R. Harrison, Nashville, Tenn.—Dr. Chickering has painted a picture for us of pneumonia existing in the Northern and Eastern states which is rather different from what we find here in the South. The disease is feared in these places even more than we fear it in Nashville, but it is sufficiently serious there. In the first series of 100 cases at the Vanderbilt University Hospital the mortality was 9 per cent, leaving out the patients who had congestive heart failure. If we add those cases the mortality from lobar pneumonia was 18 per cent. We have a large number of cases with cardiac diseases in the Hospital, as a number of us are particularly interested in them. It is necessary to consider many things in a comparison of hospital records. We have relatively more patients with heart diseases in the hospitals of the South where we have negro patients than the hospitals have in the North.

I was very much interested in the results of the cases treated with serum who had positive blood cultures. Perhaps the best evidence ever presented as to the value of type 1 serum is the fact that one may sterilize the blood stream with it, and of course we know that with a positive blood culture the patient is likely to die.

Dr. S. Chaille Jamison, New Orleans, La.—At the Charity Hospital in New Orleans, in the Tulane Unit, we have been doing considerable work with serum. Last year I reported at the State Society 60 cases treated with anti-pneumococcic serum.

One point of the greatest importance, which I did not hear Dr. Chickering stress strongly, is the day on which the patient is treated with serum. If there is considerable delay in administering the serum you can expect no results whatever. In my service after the fifth day of the disease we do not attempt to give the serum at all.

I am surprised to hear that the mortality of lobar pneumonia anywhere in the South is only 18 per cent. My experience is very different. I estimated that the mortality from the various types was at least 35 to 40 per cent in New Orleans. Other gentlemen in the South may be more fortunate.

Another interesting fact which came up when we went into this work was, first, that we found the majority of the cases were type 1 and type 2; that we found very little type 3 pneumonia in New Orleans and these few cases were mostly seen in private practice.

In the big colored services we see practically no type 4 pneumonia. My idea is (and this is borne out in private practice also) that the patients are not really sick enough with type 4 pneumonia to enter the hospital. We have seen a number of cases of type 4 since our study was made, but it seems to take care of itself.

The Felton serum is now available on the market for type 1 and type 2 infections. Also the ophthalmic test is furnished and should always be done. We had one case two weeks ago in which the intern neglected to do an ophthalmic test and after a few drops of serum were administered slowly the patient went into a very alarming anaphylactic shock. Of course, in using large amounts of type 1 serum we have had anaphylactic shock, but we have had no mortalities at all. We plan this winter to have the serum available for all of the lobar pneumonias that come in, to be turned over to one of my assistants, and we are hoping for great things, provided we can get the patients early enough. This is where the general practitioner comes in, who sees the patient on the outside. It is up to him to recognize the disease early and to give the serum promptly. If he gives a good concentrated type 1 and type 2 serum he need not wait for typing; in fact, it is not absolutely essential that it be done.

I was very much surprised to hear Dr. Chickering say that one series of statistics showed an 80 per cent mortality in type 1. I have never seen such mortality as that in type 1 pneumonia.

Dr. Chickering.—Those patients had positive blood cultures.

Dr. Jamison.—If the typing is done of the sputum, it may not be correct. Typing of sputum should always be backed up with blood cultures, which will frequently show that the patient has not the same type of infection. Again it depends on the technic of the blood culture as to whether it is positive or not. With the proper technic we can obtain a positive culture in nearly every case. We use the method of counting the number of colonies from each cubic centimeter of blood.

To bring the mortality down, even with type 1 serum, the serum must be given early. In pneumonia the patient must have the serum on the second or third day and I am sure many of you will be surprised and gratified, as I have been, to see the crisis in many cases brought on at once.

Question.—What dose do you give?

Dr. Jamison.—That depends on the severity of the case. Of course, it can be estimated by working out the immune bodies in the blood. We never give less than 100 c. c. of the old serum and repeat it every 4 to 8 hours.

Dr. R. S. Spray, Morgantown, W. Va.—I want to ask Dr. Chickering to amplify several points: first, whether true anaphylactic reactions occur in children who have had toxin-antitoxin. In recent reports from New York City I recall a statement that these children are not rendered hypersensitive.

The second point is, as I understand it, that there is no real evidence of true anaphylaxis in humans from the second use of the same type of serum. We know that we can get it in the laboratory animals. But the sudden deaths and severe reactions in humans occur as often with no previous record of serum treatment; they are allergic rather than experimental hypersensitives.

The third point is the question whether the intradermal skin tests are actually a measure of hypersensitiveness? According to Coca, I believe, there are two phases of hypersensitiveness, one of which can be

measured only by the intravenous injection. Dr. Chickering mentioned the intradermal test, which is the only one commonly used. I wonder whether that is an accurate measurement?

Dr. Chickering (closing).—Dr. Jamison is quite right about the importance of treating these cases as early as possible. If the physician who first sees the patient would start to differentiate the case and do a blood culture, treatment could be started early. On the other hand, do not give up the case because it is seen late in the disease. The patient described on the chart was seen about the fourth day of the disease. At that time she did not look very ill, but the blood culture on the following morning was positive. The physician in charge of the case, a very conservative and excellent man, believed in keeping the patient very quiet without too much therapy. She looked so well that, in spite of the blood culture, we decided not to give the serum. One week later I heard from him again. The respirations had gone up about 40, the pulse was higher and the patient looked sick. The consolidation had spread to the other lung. A blood culture at that time showed a heavier growth than the first one and I felt that we should not withhold the serum. Three doses were given. The blood culture became sterile after giving the first dose. She had a long convalescence and finally developed empyema, but recovered. That experience cheers me up when I see a late or apparently hopeless case. I believe in giving the serum, although it may be late in the disease. However, Dr. Cole and other observers have shown that the therapeutic results are much better in the group treated early in the disease.

Dr. Spray spoke of there being no record that the toxin-antitoxin material used in immunizing children against diphtheria causes sensitization to horse serum. There may be no record, but I know that sudden death in children that have been immunized has occurred when therapeutic sera have been administered. They may have had, of course, a native sensitiveness to horse serum. I know already that the Board of Health in New York no longer uses a horse antitoxin in the toxin-antitoxin mixtures. They are using goat antitoxin mixtures for the purpose of immunizing children so that there will be no possibility of sensitization to horse serum. I think the fact that they have changed is pretty good evidence that they think there is a possibility of sensitization.

The intradermal test in my experience has worked very well. We produce a wheal about a quarter of an inch in diameter with horse serum, diluted 1-10, about 0.01 c. c. If the patient is sensitive that wheal enlarges oftentimes to the size of a quarter or a dime and is surrounded by a red zone. That is a positive test and it would be very dangerous to give a regular dose of serum in those cases. In some cases the wheal remains practically unchanged, no redness develops around it, and nearly all these cases can take a whole dose, 100 c. c., of serum without any trouble.

In most cases the wheal disappears in twenty minutes. I have heard of one patient who had an anaphylactic reaction in which the skin test was negative. I did not see that patient; it has never happened to me.

I think everyone who gives serum should be prepared with adrenalin in his bag and have it ready to use if necessary. When I do the intradermal test I load my syringe at once with adrenalin. One patient had a tremendously severe anaphylactic reaction following the intradermal test, with severe itching of the palms of the hands and soles of the feet, pallor, sweating and labored breathing. He had had tetanus antitoxin in 1898 in Cuba. Under adrenalin and atropin the reaction disappeared.

Now, if the patient is sensitive to serum it is tedious work to desensitize him. Usually I start with 0.1 c. c. subcutaneously, doubling each successive dose up to 5 c. c. at half hourly intervals. If nothing happens then 0.1 c. c. is given intravenously, then 0.2, and we go right through the same procedure again. Some cases you can desensitize in twelve hours, but it means constant work. I have had patients with such severe reactions from 0.5 c. c. of serum that we finally gave up. I do not think it is wise to tire a patient with this procedure unless a bacteremia is present. If the patient has a sterile blood culture and is sensitive to serum I would rather take the chance of his getting over the pneumonia without serum. Fortunately extreme sensitiveness to horse serum is rare.

THE STUDY AND TREATMENT OF SCOLIOSIS*

By ALBERT B. FERGUSON, M.D.,
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The cases of scoliosis at the New York Orthopedic Hospital were reviewed by Dr. Hibbs, in 1924, and by Dr. Risser in an article about to be published. It is not my intention to repeat the data presented in those reviews. My purpose is to state informally some of the principles which observation of those cases has led us to accept.

It is definitely established that the course of scoliosis and the result of its treatment cannot be evaluated without adequate means of recording the deformity.

Photography and tracings are not adequate. In them the surface conformation may be sufficiently preserved to show no change, while other means of examination show that the curvature of the spine itself is increasing. Finally, a point is reached at which the muscles are unable to maintain bodily symmetry and decompensation occurs rapidly.

Measurement of sitting and standing height is helpful, as it records the rate of growth and also the ratio of length of the extremities to length of the trunk.

Roentgenograms are essential. They are the most reliable of all means of recording the deformity. The roentgenograms should be made

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both lying and erect and always in comparable positions.

The use of all of these methods demonstrates that records which do not include adequate roentgenographic examinations are too inaccurate for serious consideration. Studies without such records are justly regarded as beyond the range of rational discussion.

It is convenient to express the amount of curvature shown in a roentgenogram by a measurement which may be called the angle of the curve.

At each end of a curve that vertebra which is nearest to neutral, that is, unrotated, is selected as the end vertebra, and at the crest of the curve that vertebra which is most rotated is selected as the apex. In each of these three vertebrae the center of the shadow of the body is marked. Lines are drawn from the apex to each end. The angle of the curve is the difference between the angle formed by these two lines and 180 degrees.

With ordinary care, the limit of error in this method of expressing the amount of curvature is believed to be not over three degrees.

The tendency of scoliosis is to increase, developing a deformity which is unsightly and physiologically deleterious, that is, the deformity so interferes with bodily nutrition and the functioning of vital organs that morbidity is increased and expectation of life is shortened. The problem in the treatment of scoliosis is, therefore, to recognize the condition early and so to treat the early case that deformity will not progress. To judge the efficacy of any treatment for the prevention of progress of the deformity, certain features of the course of scoliosis must be considered.

Rapid increase of height ceases in boys at about the age of sixteen, in girls at about fifteen. Cases of scoliosis, treated or untreated, which we have followed through this period of rapid growth have often shown little or no increase of curve after the growth stopped. We, therefore, feel justified in saying that the efficacy of any method for the prevention of increase of curvature can be demonstrated only in cases that have not yet passed this period of rapid growth. If they have passed that period they may not have increased, even though they were untreated.

The period from about six years to twelve in boys, and eleven in girls, is a period of comparatively slow growth. During this period curvature in scoliosis often reaches a point where increase does not tend to be rapid and may be slight or absent. Accordingly, if scoliosis in this age period be treated and be not followed through the succeeding period of rapid growth, there can be no evidence of the efficacy of the treatment in preventing progress of the curvature, as the curve may have increased little or not at all during this period, even though untreated, while in the succeeding period of rapid growth practically all cases will show marked increase of curvature.

In view of these facts, it can be stated that to prove the efficacy of any method of treatment for the prevention of increase of spinal curvature the evidence must be obtained in cases in which it has been demonstrated that the curve is progressing, these cases being not over fourteen years of age when treatment is begun and being subject to observation until the period of rapid growth is well past.

It is from such cases that our conclusions are deduced.

I repeat, we feel that one can accept as evidence of the efficacy of any treatment of scoliosis only data based on cases not over fourteen years old when treatment is begun, the cases being followed until the period of rapid growth is well past.

In these cases, we find that braces or jackets are ineffective in stopping progress or maintaining correction of a curve. Often they have a deleterious effect, since they weaken the patient.

Gymnastics are ineffective in stopping the progress of a curve, but they do serve the purpose of improving the posture and keeping the patient in touch with a physician or institution.

The only treatment that is effective in stopping the progress of a curve is operative fusion. In other words, if a scoliotic case needs any treatment other than mere postural exercises, it needs operative treatment. We have no case in which under any other method of treatment we have been able to prove arrest of progress or even limitation of progress. Likewise, we have no case in which we have secured partial or complete correction of curvature in which that correction was maintained except by operation. The treatment of scoliosis is, then, in brief, exercises to improve posture and to keep the patient in touch with the surgeon, but where progress must be stopped or correction maintained the treatment is operation.

If operation is to be performed for any reason, the spine must, of course, be fused with the curve corrected as much as possible. To obtain correction, we have used many methods such as exercises, stretching, Abbott jackets, bed traction, traction jackets, and turnbuckle jackets. We obtain the best correction by the method we are now using, a lateral bending turnbuckle jacket with anterior and posterior hinges. The jacket is applied from the chin to the pelvis under slight traction. One or both hips may be included. The hinges are incorporated in front and in back at the level of the apex of the curve. The jacket is cut away sufficiently at the level of the hinges and is bent by a turnbuckle.

The indications for operation are:

(1) That the curve is unsightly and correctable.

(2) That it is physiologically deleterious and correctable.

(3) That it is progressing.

(4) Severe pain.

If operation is to be performed for any of these reasons, obviously the spine should be fused in the best possible position.

The objects of the operation will, therefore, be to prevent progress of the deformity and to maintain correction that has been obtained. To accomplish these purposes it is necessary to fuse those portions of the spine in which deforming forces are present, and hence it is first necessary to determine what, in effect, the deforming forces are. We say "in effect," for if the effect of a force is to move a certain point toward another point, stabilization is achieved when this movement is made impossible. Hence, we need know only what the deforming force is in effect. We do not need to know whether the force is gravity, muscle pull, growth, or some other force. We may then visualize the force as a pull approximating two designated points, as, for example, an ilio-dorsal pull. Whether, in fact, it is a push or a pull is immaterial, since fusion preventing approximation will stabilize against the force in either event.

Roentgenographic study offers several types of evidence as proof of the nature of the deforming forces in effect in any given case.

First, analogy may be shown to the type of curve produced by known causes.

If a normal subject sits erect on a tilted seat a curve is produced of typical distribution and appearance. The pelvis is tilted and the spine returns to the erect in the lumbar area, some rotation being present in the curved portion of the spine. No case of structural scoliosis can be said to be due solely to a tilted pelvis or to a tilted fifth lumbar vertebra unless it conforms to this type and distribution of curve.

In a case having a single hemi-vertebra with no other demonstrable lesion, the adjacent vertebrae above and below will tilt back toward the erect. They will never tilt further away from the erect. The curve will have an angular, not a rounded, apex. No case of structural scoliosis may be said to be due solely to wedging of a vertebra unless it conforms to this type and distribution of curve.

A second line of evidence is the demonstration of stabilization of a curve of given type in a previous case.

There is a curve of special type which we may designate a dorso-lumbar intrinsic muscle imbalance curve. In the dorso-lumbar area the spine is pinched out to the right or left in a gently rounded rotary curve, the spine above and below returning to the erect with the body well balanced. If a curve of this type be fused from one end of the curve to the other, the spine will be stabilized. There will be no progress. Correction attained will be maintained.

This observation in cases twelve to fourteen years old in which progression is demonstrated establishes the fact that the action of the deforming force in this type of curve is confined completely to the limits of the curve.

The third type of evidence is demonstration of failure of stabilization of a curve of given type in a previous case.

If in a dorso-lumbar intrinsic muscle imbalance curve only the crest of the curve is fused, progress will not stop; correction will not be maintained. This demonstrates that the deforming force extends from one end of the curve to the other. It can be visualized as a pull approximating the cephalic end vertebra of the curve to the caudal end vertebra.

I have mentioned three types of evidence acceptable as proof as to the nature of the deforming forces in effect in any given case, namely:

(1) Analogy to the type of curve produced by known causes.

(2) Demonstration of stabilization of a curve of given type in a previous case not yet at the end of the period of rapid growth.

(3) Demonstration of failure of stabilization of a curve of given type in a previous case.

Each of these lines of evidence deals with previous experience. There are three other lines of evidence which deal directly with a given case, but before stating these I wish to enumerate some of the roentgenographic studies which may be made in these cases.

It is the function of the spinal muscles to hold the body erect, in balance, with the head erect and centered over the pelvis. If a deforming factor is introduced the muscles, if normal, will bring the head erect over the center of the pelvis with the body in balance. The functioning of the muscles may, therefore, be studied by introducing deforming factors, the power of various muscle groups may be studied by forcing their contraction, and contractures may be studied by determining their resistance to correction.

For these studies roentgenographs in many positions may be made. In the erect, sitting, a level pelvis may be tilted, a tilted pelvis may be made level, the superior surface of a tilted fifth lumbar vertebra may be made level, the patient may lean to the side, or hold a weight in the hand. Standing, the same examinations may be made. Lying, the patient may be bent to the side, put under traction, and so forth. By means of such studies we derive the additional lines of evidence as to the nature of the deforming forces present in the given case.

These lines of evidence are:

First, demonstration of a marked tendency to correction of a curve on rectification of the supposed cause.

If a patient with a curve supposedly due to tilt of the fifth lumbar vertebra be so seated that the superior surface of this vertebra be horizontal, there will be a marked tendency to correction of the curve if it is in fact due to the fifth lumbar tilt.

Again, there is a type of lumbar curve which shows little rotation. The upper end of the curve is at about the first lumbar vertebra, which is out of the center line of the pelvis on the concave side of the curve. The spine above this vertebra may return to the erect or may show a compensatory curve. If in this curve the psoas muscle on the convex side of the curve be contracted against resistance the spine may become completely straight. This is regarded as evidence that the curve is due to weakness of that psoas muscle, as other types of curve merely show a sway of the spine as a whole on this test.

The second type of evidence derived from the given case is the study of muscle balances.

If a right dorsal, left lumbar, curve be examined with the patient sitting with the left pelvis elevated, there should be more tendency for the curve to correct for this tilt in the lumbar curve than in the dorsal; for if there be no lumbar correction there is weight displacement to the right in the lumbar region which must be equalized by weight displacement to the left in the dorsal region to maintain balance. This would be a much more difficult compensation for the tilt than simple lumbar compensation. Hence, the absence of adequate compensation in the lumbar area for the induced pelvic tilt indicates that in effect the muscles to the left of the lumbar spine are weak and hence a right pull is present in the lumbar area. In the same case the pelvis may be tilted to the right to study the power of the muscles to the right of the dorsal curve.

The third type of evidence derived from the given case is elimination by *reductio ad absurdum*.

If we assume that one of the two or three curves present be the primary, the remaining portions of the spine will be devoted to bringing the head erect over the pelvis with the body in balance and this will be accomplished in the easiest way possible, making allowance in some cases for the fact that the supposed primary curve is near the end of the spine, so that the amount of compensation obtainable in the end area may be limited by shortness of this area.

If, in a case presenting a slight right dorsal and a marked left lumbar curve, it be assumed that the primary deforming force produces the slight right dorsal curve and that the marked left lumbar curve is compensatory, this is reducible to an absurdity; for the tendency to curve to obtain compensation is limited by the degree of the primary curve and hence there can be no degree of curvature due to compensation beyond that degree at which compensation is established. Except when the compensatory area is short, the compensatory curve cannot exceed in degree the primary curve.

When the deforming forces in a given case

have been determined by such studies as I have enumerated, the primary curve is corrected as much as possible and then the operation area is selected. There are five principles to be observed in this selection.

(1) The primary curve must be fused from end vertebra to end vertebra.

(2) The fusion must be extended beyond the primary curve to include compensation. In the method of bent jacket correction which I have described, the spine adjacent to the primary curve is bent in the direction of compensation. If the increased bend close to the primary curve be included in the operation area the remainder of the spine will be free from the necessity for compensation and will become straight and flexible.

(3) In the included compensation, fusion must stop at a point which as nearly as possible leaves the vertebral surfaces at the ends of the fused portion parallel to each other and at right angles to a line joining their centers. In this position complete compensation is included within the operation area.

(4) The solidified area of the spine must be stabilized against the pelvis. If we have a primary dorsal curve, the upper end of which is far out of the center line of the pelvis, an iliodorsal pull is present. If only the primary curve be fused this pull will later move the whole fused area downward and laterally relative to the pelvis. Stabilization of the operation area against this pull can be achieved in one of three ways:

(A) Fusion may be extended to the pelvis.

(B) In dorsal curves it may be extended so near the pelvis that the lower end of the fusion area cannot depart appreciably from the midline. (This means extension to the fourth, or in some cases the third lumbar vertebra.)

(C) In high dorsal curves fusion may be extended downward until a sufficient number of strong balanced muscles attach to the solidified area so that these muscles will be powerful enough to hold the fused mass. This fusion requires six or seven vertebrae below the end of the primary curve.

(5) The fifth principle in the selection of the operation area is that the patient must be correctly postured. A long fusion from the pelvis upward may be correct in a patient with a level pelvis, but is decidedly incorrect for a patient with a short leg. The patient must be considered from the ground up to determine that the contemplated fusion will produce the proper posture for that particular patient.

Our experience has demonstrated that even the most skillful operators may fail properly to identify the vertebrae. An error of a single vertebra may result in the patient's being badly out of balance. Hence, it is necessary to mark the vertebrae. For this purpose the skin over a spinous process is marked with silver nitrate. A lead marker is placed on this line and a roentgenogram is made. The marked vertebra is then identified, the operation area is selected with reference to this vertebra, and at operation the first incision is carried down to the spine under the silver nitrate line and the corresponding spinous process is identified.

At the New York Orthopedic Hospital, the operation in these cases is performed without removing the correcting jacket, which is left on for twelve weeks. The patient is then allowed up in a slightly bent jacket extending from the pelvis to the chin. This jacket is worn for seven months to one year after operation.

The operation used is the Hibbs fusion. When marked correction is obtained and when the curve would tend to increase for several years, there are tremendous stresses on the fusion area. That the fusion operation yields a sufficiently strong bone mass to withstand these stresses is demonstrated by the studies of Dr. Hibbs and Dr. Risser.

CONCLUSIONS

The study of scoliosis requires accurate records, including roentgenograms in the erect and recumbent positions.

The tendency of scoliosis is to progress. The marked deformities of scoliosis can be prevented by early recognition and adequate treatment.

Claims of efficacy of any treatment of scoliosis are regarded as unproved if adequate roentgenographic records be not kept, if the subjects be over fourteen years old when treatment is begun, and if observation of the cases be not continued until the period of rapid growth is well past.

Under these conditions, the only method of treatment found effective in preventing progress of scoliosis is operative fusion.

Thorough roentgenographic study is necessary for the selection of the proper operation area in each case.

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OBSERVATIONS ON YELLOW FEVER*

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It is a little more than two years since Stokes and his associates made the discovery that the ordinary Indian monkey (*Macacus rhesus*) is extremely susceptible to yellow fever. So it is feasible and altogether desirable now to carry out laboratory studies on this disease in a northern climate where conditions are much safer for every one concerned. For my own work with yellow fever patients I had the good fortune to be associated with French physicians in West Africa, taking with me some rhesus monkeys to Senegal and also a strain of stegomyia mosquitoes that came originally from Havana. Dr. Mathis, Dr. Laigret and I infected these monkeys and mosquitoes with yellow fever. Having secured the virus, there remained the problem of getting it home safely. The journey to Africa is a long one, the route ordinarily traveled being by way of England. On my way out I stopped in London, where Dr. Wenyon, the Director of the Wellcome Bureau, was extraordinarily helpful and very stimulating in his friendly encouragement. He said: 'Yes, you'll be sure to find some yellow fever patients and you'll bring the virus home in a little tube.' Later on, in Senegal with the virus in hand, this remark of Dr. Wenyon's came back to me and it seemed as though there ought to be some simple way of preserving it for a few weeks. Of the procedures available for field work, merely freezing some infective tissue is often an efficient means of preservation. Even the poorest steamers have freezing compartments. So in addition to other material, some infective liver and blood were frozen under aerobic conditions, the vials being sealed to exclude the freezing mixture. These specimens were carried to London, where Dr. Hindle very kindly arranged for the testing of the material. The first monkey inoculated died in seven days of typical yellow fever.

This French virus is extremely virulent for monkeys. Occasionally death occurs without fever in less than four days from the time of intraperitoneal inoculation of a suspension of a gram or so of liver. I have tried to maintain the material at a slightly lower degree of virulence and ordinarily the animals die in five to seven days. Under exceptional circumstances, the course of the disease may be greatly prolonged. In one instance a monkey died 26 days after injection. This suggests that the quarantine period of six days, though sufficiently long for practical purposes, does not necessarily afford full protection for the exclusion of yellow fever. In the animals which show a febrile reaction there is usually one and sometimes two days of fever. For the purpose of maintaining a stock of virus in the laboratory, the plan has been adopted of using animals late in the course of the disease, saving specimens of blood rather than liver. Frozen blood retains its virulence very well; in one instance, 4 c. c. that had been kept six months at about —7° C. killed a monkey in six days after intraperitoneal inoculation.

The late stages of the disease afford a favorable period for infecting mosquitoes. In some instances mosquitoes were not regularly infective after feeding on a monkey on the first day that there was any rise in temperature. On the other hand, one lot of mosquitoes was fed on a monkey *in extremis* which died before the mosquitoes were fully engorged. Subsequently a single mosquito of this lot bit a monkey and a typical reaction developed.

You all know that, from experiments on human volunteers, it was determined that the blood is infective only during the first three days of fever and that twelve days is the usual time required for the development of the virus in the mosquito. These data represent optimal conditions for the propagation of the infection, but they cannot be taken as absolute. Nevertheless, the infectivity of the blood of a monkey at the time of death may seem to violate these principles as determined by the limited experimentation that was permissible with human volunteers. The total course of the disease in monkeys is sometimes shorter than the average incubation time in man. If by some misfortune an epidemic of yellow fever occurred with fulminating cases, then the behavior in man might

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approximate the conditions seen in fulminating cases in monkeys.

Infective liver may retain its virulence for long periods. A supply was brought home in frozen condition from London and kept in the laboratory at about —7° C. Portions of this specimen were tested on monkeys at intervals of four weeks. It retained its virulence, producing fatal infections for twelve weeks, but, after each interval of four weeks, the symptoms were milder and the disease ran a longer course. The monkeys injected with specimens 16 weeks and 20 weeks old remained well. Subsequently, when given an immunity test, they developed fever but recovered promptly.

Another specimen of liver was taken from a dying monkey. Histologically, the sections showed generalized necrosis. The specimen was frozen, but after a period of only twelve days, the virulence was extremely low. Of three monkeys that were inoculated, one appeared sick and recovered and the other two died 13 and 19 days after injection. The first specimen of liver that retained its virulence well was taken a little earlier in the disease, the sections stained with hematoxylin and eosin showing the usual fatty infiltration. Sections stained with eosin and methylene blue showed marked mid-zonal degeneration and some dead cells were seen, but the lesion was evidently in an early stage. Therefore for the next stock of virus, a monkey was killed on the first day of fever. The liver was entirely normal histologically. A frozen specimen 16 weeks later killed a monkey in five days; but only four weeks later an animal was merely immunized by the injection of this material.

The actual necrosis of the liver ordinarily comes late in the disease. Some animals that were killed about 24 to 36 hours before death was expected to occur, showed fatty infiltration and sometimes degeneration of the liver cells, but no necrosis. This explosive termination fits in with the clinical symptoms. A patient who appears to be holding his own very well indeed may suddenly collapse. In view of the extensive destruction of the liver in fatal cases one is often asked whether convalescents eventually develop cirrhosis or other complications. Ordinarily they do not. It seems reasonable to suppose that, in the cases which recover, the liver lesions do not progress to the extent of widespread necrosis.

One of the Brazilian authorities, Torres, has been working with strains of yellow fever that seem to be milder than those obtained in West Africa. Torres reports that monkeys may develop fatal infections without showing the characteristic necrosis of the liver. With the virulent African strain, there is ordinarily extensive liver destruction. In exceptional cases, the liver may show only early lesions at the time of death. We know very little about the exact cause of death in yellow fever. For my part, I am open minded to the suggestion that, if the liver escapes serious injury, the virus of yellow fever can still kill the animal. Consequently one might well be a little cautious about excluding the diagnosis of yellow fever in sporadic cases in man which fail to show typical necrosis of the liver.

The army board demonstrated many years ago in Cuba that the virus of yellow fever is readily filterable. I have listened with much interest to the clear description which Dr. Cowdry has just given of cellular inclusions. Yellow fever and dengue fever are, in many ways, closely related and dengue fever in turn has some more or less fundamental characteristics in common with the rickettsia group of diseases. In many ways infective mosquitoes would appear to furnish promising material for examination for the causative organism. Accordingly, mosquitoes infected with yellow fever were dissected and also cut in serial sections and examined after staining with Giemsa particularly for rickettsia but also for any other characteristic findings. In a small proportion, masses of rickettsia-like micro-organisms were found in the stomach but not with the constancy and regularity that they are seen in lice and ticks infected with typhus and spotted fever. Usually the stomach of normal mosquitoes is remarkably free from ordinary bacteria. In the search for the etiologic agent of yellow fever it would be a distinct step forward to find micro-organisms which had left the stomach and penetrated the tissues of the mosquito. A drop of clear blood from the mosquito affords a wonderfully delicate background for searching for minute micro-organisms. Therefore some experiments have been started with the purpose of locating the seat of infection in the mosquito.

The legs of a mosquito of course contain traces of blood. Seven females, from a lot of mosquitoes known to be infective, were killed, the legs were removed and ground in a small agate mortar and injected into a monkey; the animal was neither infected nor immunized. For the next step, a little blood was withdrawn from some mosquitoes. On inserting a Barber pipette into the thorax of a mosquito, a minute but distinctly visible drop of clear fluid is obtained. The blood was withdrawn in this manner from four mosquitoes taken from an infective lot and injected into a monkey. This animal also was neither infected nor immunized. As a control, after withdrawing blood from these mosquitoes, the tips of the abdomen were cut off removing about three or four of the terminal segments from each one. These segments were ground and injected into a monkey.

Death occurred 17 days later and the autopsy showed typical yellow fever.

Another lot of mosquitoes was infected on an extremely sick monkey whose temperature had fallen to 95° F. Nearly three weeks later, three of these mosquitoes were dissected and the stomach was divided into two parts. One portion was smeared and stained and the other was injected subcutaneously into three monkeys using one monkey for each mosquito. These three animals died typically within eight to eleven days.

It is difficult to secure convincing evidence regarding infectivity of the salivary glands of the mosquito. One must keep in mind the possibility that during the removal of the glands they may be contaminated with other tissues of the mosquito. Perhaps the question of the infectivity of the salivary glands can be approached in an indirect manner. Some experiments are in progress now to determine the effect of allowing an infected mosquito to feed on an immune monkey. When a mosquito takes a blood meal the blood before absorption is broken down by the digestive ferments. Therefore one might argue that immune blood taken into the stomach would not have much opportunity to reach any parasites that might be in the salivary glands.

In the first test, ten mosquitoes were taken from an infective lot. As a control, two of the ten were allowed to bite a monkey and a fatal infection resulted. The other eight were given a blood meal on a monkey immune to yellow fever; seven days later these eight mosquitoes bit a monkey and the animal remained well.

This work will be followed up because it is important to know whether the immunes in a community are an active or a passive factor as regards the spread of yellow fever. The three factors ordinarily considered are the number of patients, the mosquito population and the number of susceptible individuals, but the role of immunes must be determined.

In some of the insect-borne diseases, it is assumed that the parasites were originally restricted to insects and in the course of evolution became more or less well adapted to warm-blooded animals. Consequently the optimum temperature of growth for such a parasite may be the temperature of the insect or it may be higher. In yellow fever, Marchoux and the French Commission considered that at 20° C. the causative organism does not develop in the mosquito. At 28° C. development is rapid. Thus far I have made one test at body temperature.

About 20 normal mosquitoes were fed on an infected monkey and then incubated for 48 hours at 37° C. By this time all but five of these mosquitoes were dead and the living ones were kept four days longer at 28° C. Then all five bit a monkey and he died 13 days later with typical lesions.

With the idea of rickettsia diseases in mind, some observations were made on the behavior of the virus of yellow fever in the guinea pig. Tsutsugamushi or Japanese flood river fever, is very probably due to rickettsia and this infection can be reproduced in the monkey; guinea pigs when inoculated with infective material show no symptoms, yet they conserve the virus. An analogous test was made with yellow fever.

Four c. c. of a thick suspension of brain from a monkey infected with yellow fever was inoculated into a guinea pig. One week later the spleen of this animal was ground up with saline and injected together with some of this guinea pig's blood into another guinea pig. Five days later a similar injection was made into a third guinea pig. All the injections were made intraperitoneally and these animals all remained well and showed no rise in temperature and no evidence in the gross of any lesions at autopsy. The third guinea pig of this series was killed five days after injection and the spleen and blood were inoculated into a monkey. These guinea pigs were handled with all the care that one takes with an infected animal though this precaution seemed entirely superfluous. The inoculated monkey died of typical yellow fever in less than three days after injection. This extremely rapid course strongly suggests that the virus multiplied in the guinea pig. On a repetition of this experiment, the monkey inoculated with material from the third passage in guinea pigs was neither infected nor immunized. Subsequently the virus was again passed successfully through a series of three guinea pigs. Evidently individual guinea pigs vary considerably in their behavior.

For example two guinea pigs of similar size were inoculated with 3.5 c. c. each of one specimen of infective blood from a monkey. One week later half of the spleen and 4 c. c. of blood from each of these guinea pigs was injected intraperitoneally into each of two monkeys. One of the monkeys ran a typical course of eight days duration and the other remained well and susceptible. Several repetitions of these experiments were made with slight modification and similar results were obtained.

As yet there has not been any opportunity to survey adequately the behavior of other animals. The guinea pig is neither susceptible nor entirely refractory, but it may harbor an inapparent infection with yellow fever. This must not be interpreted as constituting any definite evidence that yellow fever is a rickettsia disease.

Some effort was made to find material from infected monkeys that would be particularly suitable for etiological studies. Cerebrospinal fluid was tested and also the fluid from the anterior chamber of the eye.

One monkey was inoculated intraperitoneally with 0.3 c. c. of cerebrospinal fluid and was *in extremis* 4 days later; another inoculated with 0.4 c. c. of another specimen of cerebrospinal fluid was found dead five days later. A third monkey injected intraperitoneally with

nearly 0.3 c. c. of fluid from the anterior chamber of the eye was in a dying condition five days later. A fourth monkey injected with about 0.2 c. c. of a second specimen of fluid from the anterior chamber of the eye was found dead nine days later. At autopsy all of these animals showed the typical lesions of yellow fever.

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DISCUSSION (*Abstract*)

Dr. Edmund V. Cowdry, St. Louis, Mo.—I am glad that Dr. Sellards has made a systematic search for organisms of the rickettsia group, because the insect transmission, the early lesions and some other characteristics of yellow fever are comparable with an infection by rickettsiae. It is necessary, where so little is known, to explore all the possibilities. My experience has been similar to that of Dr. Sellards insofar as I have looked for rickettsiae, both in mosquitoes carrying the virus and in the lesions, with entirely negative results.

THE EVALUATION OF FOCAL INFECTION IN CUTANEOUS MEDICINE*

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Among the many theories elaborated to explain the phenomena of morbid processes, none has seemed at first glance so attractive, so readily applicable to many diseases as that of bacterial foci from which systemic infections take place. Following, as it did, in logical sequence, the identification of specific microbes as causative agents in the production of disease, and the subsequent knowledge of bacterial sepsis, it is readily comprehensible why the theory of focal infection should have been readily applied to hitherto unknown etiological entities.

That focal infection has passed from a scientific theory to a proved principle cannot be gainsaid. The work of Billings, Rosenow, Holman and many others in this Country and abroad has established beyond peradventure that its application to certain disease processes fulfills all scientific postulates. However, it must also be admitted that, like uric acid, the theory of focal infection has had woven about its application as much of fiction as of truth.

Of particular interest to us is the application of this theory to the causation of certain dermatoses of which at this time we know lamentably little.

There is a basic misconception and rather widely current confusion in the minds of many who have written and spoken on this subject, between the terms, focus of infection and focal infection. The two are frequently loosely and synonymously applied in both writing and discussion, when in fact they should be sharply differentiated.

Billings described a focus of infection as a circumscribed area of tissue infected with pathogenic organisms. Holman has pointed out, therefore, that any condition resulting from the systemic dissemination of bacteria from the source or focus becomes a focal infection. It is therefore self-evident that focal infection results from foci of infection and the two terms, although related sequentially, have different identities and must not be confused. In an analysis we must at all times distinguish between these terms.

Perhaps the simplest example of proven focus and consequent focal dissemination is the chancre of syphilis; here we have a nidus of pathogenic organisms leading to more or less rapid dissemination and to remote morbid processes in the skin and mucous membranes, thus representing admirably a focal infective process.

It seems quite natural that in the ten or more years since Billings' first paper on focal infection the theory should have found favor among dermatologists, and an honest effort should have been made to apply it to our many obscure etiological problems.

When the initial wave of enthusiasm passed, it was found as in other developments of medical science, that something new had been added to our knowledge of disease cause, but much was left over to be explained on other theories. It is safe to state that at some time or other almost every etiologically obscure dermatosis has been said to result from a focus of infection, but only a few have stood the rigid scrutiny of scientific accuracy and have been established as of such origin.

With the clear-cut definition of a focus of

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infection as a nidus of pathogenic organisms, and of focal infection as the expression of systemic invasion by these organisms, very rigid criteria should be applied to a disease, together with convincing experimental evidence, before it is put down as an example of a focal infective process.

In by far the majority of examples in dermatology where focal infection has been suggested as the cause of symptoms, the case has been made on suggestive criteria and on clinical data. Thus, one observer with a series of cases of, let us say, alopecia areata, in which dental caries has co-existed, expressed the opinion that the latter as foci caused the former. His view was perhaps strengthened by the clinical observation that the alopecia disappeared after removal of the alleged foci. I shall hope to show later that while such evidence is perhaps suggestive or presumptive, it lacks scientific accuracy and does not sufficiently support accepted postulates for cause and effect in disease.

At some time or other the following diseases have been considered to be due to foci, and therefore examples of focal infective processes: urticaria, urticaria pigmentosa, eczema, the erythema multiforme group, cutaneous tuberculosis and the tuberculides, hemorrhage, petechiae, purpura hemorrhagica, herpes zoster, pemphigus, dermatitis herpetiformis, lupus erythematosus, keratosis blenorrhagica, and many others.

It also appears that in a few cases focal infection adequately explains certain cutaneous diseases in which up to now, to the best of my knowledge, that cause was not suggested for them. Such are the trichophytides, sporotrichosis, tularemia, and probably vaccinia and certain of the contagious exanthems.

It might be well at this time to apply rigid scientific criteria to the above groups, and to see to what extent focal infection is proven in one group, presumptive or likely in a second, and unlikely or improbable in the third.

In the proven group stand out syphilis, sporotrichosis and tularemia with their portals of entry in an injury, occasional cases of blastomycosis, the petechial and hemorrhagic lesions of bacterial sepsis, the trichophytides, scarlet fever, vaccinia, and the many extraordinary mutation forms of skin tuberculosis, including the sarcoid of Boeck, the deep tuberculosis of the hypoderm, and many of the so-called tuberculides.

It may well be argued that systemic or blood-borne tubercle bacilli are difficult to determine, and that with all the evidence not at hand in every case, it would seem improper, for example, to class lupus vulgaris in its many clinical forms, sarcoid tumor, lupus miliaris, and lichen scrofulosorum as examples of tubercle implantation from a remote focus.

Admitting the validity of this argument, it is nevertheless true that the overwhelming preponderance of opinion favors the view that these are endogenous blood- or lymph-borne infections, and the weight of clinical evidence, together with some experimental proof, supports this view.

When we come to the tuberculides, however, we face a group of conditions which in part fit in with the concept of focal infections, and in part do not.

It seems to be accepted that certain tuberculides are actually embolic tuberculous lesions. Bacilli have at times, with difficulty to be sure, been demonstrated, or occasionally animal inoculation has shown the lesions to contain bacilli. Others, on the other hand, are widely if not generally accepted as evidence of tissue changes due to tubercle toxin liberated from a tuberculous focus. To include such a group, providing the hypothesis of their nature is correct, in the class of focal infections, would necessitate a wider interpretation of our theory than we postulated at the outset.

In the interest of scientific accuracy, therefore, it would seem wiser to limit the term focal infection to those conditions in which systemic dissemination of pathogenic organisms occurs, and to place the group of toxic tissue changes from remote foci, in a class which might properly be called, focal irritative processes. Into such a group would also follow certain other entities to which I shall refer shortly.

Into the group of proven cases, thanks to the work of Jadassohn, Bloch, Sulzberger and others, we may now place the interesting examples of dermatoses which occur in remote parts of the body due to systemic dissemination of mycelia and spores, emanating from such lesions as kerion, to which the name trichophytides has been given. The identification of this group and the demonstration of the condition as a systemic infection constitutes a real scientific dermatologic achievement.

The petechial hemorrhages and purpura which are seen in the skin incident to bacterial endocarditis and to general sepsis, also fulfill the

postulates of focal infections as do the rose spots of typhoid fever.

Scarlet fever is, of course, as good an example as is syphilis of a focal infection if we accept the throat as the portal of entry of the streptococcus which produces the septic erythema.

The weight of evidence also supports the view of a focal infection for the other contagious exanthems as well. Until we know more about the smallpox virus and the infectious agents of measles and chickenpox, however, we must place the entire group aside from scarlet fever and vaccinia as presumptive but not proven cases.

Sporotrichosis and tularemia are strikingly similar in their mode of onset as starting with lymph-borne infections, which occasionally develop septic manifestations. Both conform admirably to the criteria of focal infective processes.

We have inadequate knowledge of the entrance of leprosy into the body, and as to whether it establishes itself as a single bacterial focus from which ultimate lepromata are disseminated. Its natural history is so different from that of other human pathological processes that it does not lend itself to analogy.

Yaws in all probability fulfills the conditions of a focal infection, but until its epidemic character and method of transmission are better known, it is best not to include it in the proven focal infectious group at this time.

Although Rosenow has shown bacteria in some of the lesions of erythema multiforme, notably in erythema nodosum, and demonstrated similar strains in the tonsils and elsewhere, I do not believe the evidence at this time is sufficiently strong to place this very large and varied group of cutaneous pictures with the proved cases of focal infection. The weight of clinical evidence, to be sure, in some cases such as nodosa erythema in association with rheumatic fever, points to bacterial dissemination. However, it seems quite likely that many forms of erythema multiforme, perhaps the majority, are toxic rather than microbic processes. Many, indeed, very definitely refer back to such causes as foreign protein and drugs, thus establishing for them other etiologic factors than infective foci.

While for the entire erythema multiforme group, foci of infection, therefore, as a cause do not fit, in isolated cases we may occasionally be dealing with embolic bacterial dissemination.

Toxins rather than infective organisms explain even more readily the urticaria group of dermatoses. These at one time may be due to local toxic irritations and at others to systemic intoxications, as from protein sensitization or from toxins associated with gall bladder and hepatic disease. While frequent clinical evidence supports the view of foci of infection as the cause of urticaria, the local manifestation is never an evidence of systemic sepsis. It is a focal irritative rather than a focal infective process.

Herpes zoster is another disease probably definitely specific and due to a bacterial focus. The remote lesion on the skin, however, can very properly be regarded as focal irritative rather than focal infective sequela. The immunity usually conferred by herpes zoster, moreover, does not fit in with the view that it is a focal infective condition, yet it stands out as an admirable example of a change in a remote portion of the body dependent upon a focus of infection.

A disease which may at some time be shown to be a focal infection, in which the evidence thus far is supported only by clinical evidence, is pityriasis rosea. The frequency of an initial plaque in this disease, the sudden explosion of satellite lesions support the view that we are dealing with a systemic dissemination of an infectious agent from a primary plaque. My own experiments with this disease, extending over five years, while inconclusive, strengthen my belief that a specific infectious agent is its cause.

Alopecia areata has been supported by many as an example of a focal infective disease. It is certainly true that the removal of carious and abscessed teeth has frequently resulted in the cure of this condition. Likewise, the uncovering of visual difficulties, sinus infection, and other foci of infection or irritation in the head, has resulted in spontaneous cure of the baldness.

There is to my knowledge, however, no direct experimental evidence to show that alopecia areata can, in the strictest sense of the word, be a focal infection. If the vast preponderance of cases cleared up upon removal of infectious foci, which in fact does not occur, the disease could at most be placed, like herpes zoster, in the group of focal irritative processes.

Many of our deductions as to the focal infective character of a disease are based first upon the establishment of a focus of infection, second

upon the disappearance of the general process after the removal of the alleged focus.

Both hypotheses are open to criticism. Most individuals can be shown to have some demonstrable focus of infection in the teeth, tonsils, gall bladder, appendix, prostate, or elsewhere. The finding of a focus is, therefore, only suggestive. Thus, if a tuberculous focus were found in a lymph node or tonsil in the presence of a cutaneous tuberculosis, the case would at once suggest the relationship between the two conditions.

The clearing up of a systemic condition or of a dermatosis upon the removal of a focus of infection, however, has importance where bacteriologic proof is lacking, only when it occurs with great regularity, and only when other causes cannot operate to produce the same condition. Under these circumstances, focal infection may be assumed, but its ultimate proof still requires the demonstration of a pathogenic organism in both cause and result.

Where occasional cure of a dermatosis occurs upon removal of a focus, it is more than likely that it results from the relief of inhibitory forces which such a focus may exercise on general conditions; or it may be a response in general well being, resulting from the removal of the focus. These factors will explain the cases of lupus erythematosus and of dermatitis herpetiformis, which occasionally clear up rapidly upon removal of infected foci. In both of these conditions the weight of evidence is against their being focal infective processes.

It may properly be pointed out that occasionally the removal of a focus which, without doubt, is the causative factor of a dermatosis, is not followed by involution or even improvement in the focal infection. The demonstration and removal, for example, of a tuberculous lymph gland in the neck would effect little, if any, change in a well-developed patch of lupus vulgaris, although it might well be a preventive measure against the development of new lesions. Irreparable tissue damage due to embolic germ dissemination cannot be followed by restitution when the source of the infection is laid bare and removed.

In conclusion, it may be emphasized that foci of infection play either a causal or a casual role in the etiology of many dermatoses, or their presence may have nothing whatever to do with the disease in question.

Where the foci are causal, we are dealing with true focal infection as determined by blood-borne dissemination of the pathogenic organism from the focus to the satellite lesion.

This occurs in a proven fashion in syphilis, cutaneous tuberculosis, certain tuberculides, the trichophytides, sporotrichosis, tularemia, systemic blastomycosis, vaccinia, and scarlet fever.

A casual relationship occurs between foci and certain dermatoses with such frequency as to merit notice, and possibly to constitute a contributory etiologic factor in such conditions as erythema multiforme, dermatitis herpetiformis, and alopecia areata.

Finally, to the focal infective process might well be added a group in which foci of infection play a direct role in the causation of satellite cutaneous lesions, in which pathogenic organisms are not present, but in which the tissue damage is apparently due to a toxic process. This occurs in herpes zoster, in some of the so-called toxi-tuberculides, in many of the multiforme erythemas, and occasionally in urticaria. This group might properly be referred to as focal irritative processes.

END-RESULTS AND IMPRESSIONS IN THE SURGICAL TREATMENT OF FIVE HUNDRED CASES OF GOITER*

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The mortality in the surgical treatment of goiter is no longer our chief concern. Increased experience in selection, preparation, technic and the control of thyroid crisis has reduced the death rate to 1 per cent in well organized thyroid clinics.

The present study is based upon 890 thyroidectomies. Five hundred and seven of these cases have been followed from one to ten years and have had repeated clinical and metabolic examinations. We do not feel that information obtained by follow-up letters is of much value.

The object of this investigation was to learn, first, our end-results in the surgical treatment of goiter, following a standardized technic, removing the same amount of thyroid tissue in all

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types; second, the relationship between the degree of hyperthyroidism and the clinical results; third, the relationship between the degree of involution following Lugol's solution and end-results; fourth, the relationship between iodin therapy before and after operation and post-operative basal metabolic readings; fifth, the relationship between the duration of the disease and clinical results; sixth, to determine whether operation offered a sufficient guarantee of cure, relief of disabling symptoms and increase of life expectancy in rehabilitation of the patient.

The results are based upon the anatomic, symptomatic and economic status of the patient and the cases are classified as complete cures, subjective cures, improved cases, and failures.

(1) The complete cures are patients who have been relieved of every symptom and have regained their former health.

(2) In the subjective cures, the basal metabolic rate is normal. The patients feel well and are able to resume normal activities and to stand emotional and physical strain. There may be mild residual symptoms of hyperthyroidism, such as exophthalmos, tremors, tachycardia and nervousness.

(3) The improved cases represent those who had stage operations and did not return for further surgery.

(4) Failures are the patients who showed no clinical improvement following operation.

CLASSIFICATION

The most confusing, complex, and difficult phase of the goiter problem to the general practitioner has been the classification. Almost every man giving special attention to goiter has a classification of his own. No classification at present meets the ideal requirements of the clinician, the surgeon and the pathologist. The most generally accepted classification divides goiters into the adolescent, the colloid, non-toxic adenomas, toxic adenomas and the exophthalmic type, with or without eye signs. This classification emphasizes certain prominent clinical groups. We feel that the different types are related, that pathological evidence is tending to bear this out and that it will ultimately be found that the differences are truly in degree. In order to compare our results with the literature and different thyroid clinics, the following clinical classification was adopted in my clinic:

(1) Colloid goiter.
(2) Adenoma or nodular goiter.
(3) Hyperthyroidism.
  (a) Graves' disease, primary.
  (b) Adenoma or nodular, secondary.

The groups studied showed twelve colloids, 129 adenomas, 165 adenomas with hyperthyroidism, and 201 cases of Graves' disease.

Colloid Goiter.—The youngest patient was 15, the oldest was 22 years of age. The average age was 18 years.

Adenoma.—The youngest was 16, the oldest 61 years of age. The average age was 31.5 years.

Adenoma with Hyperthyroidism.—The youngest was 16, the oldest 70 years of age. The average age was 39.3 years.

Graves' Disease.—The youngest was six, the oldest was 53 years of age. The average age was 33 years.

The sex ratio showed five females to one male. The average duration of toxic symptoms in both types of hyperthyroidism was 16.5 months; in adenomas 23 months; in Graves' disease, ten months.

The average pulse rate in non-toxic goiter was 77. In hyperthyroidism it was 120. On discharge the average pulse rate was 79. The final pulse rate was 71.

The average basal metabolic rate in non-toxic goiter was plus 3, in hyperthyroidism, plus 50 on admission. The average drop in metabolism during pre-operative treatment was plus 25. The average daily drop was 3.1. The average post-operative rate in hyperthyroidism was minus 7.3.

The average blood pressure before and after operation showed no significant variations. Exophthalmos was present in 35 per cent of cases of Graves' disease. There were 20 cases of auricular fibrillation before operation, all occurring in adenomas except one in a case of Graves' disease.

The average loss of weight before operation was 25 pounds. The average gain after operation was 23 pounds.

The average hospital confinement was 18 days.

The mortality was eight cases in 890 subtotal thyroidectomies, or 0.89 per cent.

Primary thyroidectomy was done in 91 per cent of cases; the two-stage operation in 6 per cent and three stages were used in 3 per cent of the cases.

Ninety-five per cent of the cases were completely cured. Four per cent were subjectively well and 1 per cent were failures. There was only one recurrence.

Post-operative myxedema occurred in four cases. They all responded to desiccated thyroid extract and were well in three months' time after operation. Sections of all four cases showed degrees of thyroiditis.

There were three cases of post-operative tetany. Two cases recovered in a few days. The other case was on treatment for four months before all treatment could be discontinued and the normal blood calcium maintained.

Three cases had severe infection, which necessitated opening up the neck for drainage and a subsequent secondary closure. Pneumonia was recorded in five cases. Post-operative hemorrhage and injury of the recurrent laryngeal nerve were recorded each in one case.

The cause of death in the entire series of 890 cases of subtotal thyroidectomy were as follows:

Post-operative hyperthyroidism, 3.
Pneumonia, 2.
Pulmonary embolism, 1.
Cardiac failure, 2.

DISCUSSION

Iodin.—The use of Lugol's solution was first confined to frank cases of Graves' disease. We were surprised to find the same improvement in a case of adenoma with hyperthyroidism which had been erroneously diagnosed as Graves' disease. We felt that further evidence concerning the results of treating adenoma with hyperthyroidism with iodin should be obtained. Complete data was obtained in one hundred unselected cases which had not been previously treated with iodin. Eighty-five of these showed a favorable response, similar to that observed in unselected cases of Graves' disease. In ten cases there was a moderate improvement; in five cases, no response.

Adenoma with hyperthyroidism, not treated with iodin, did not show the characteristic sudden drop in the metabolic rate and remission in clinical signs and symptoms seen in the patients treated with iodin. There was an average of 40 per cent drop in the basal metabolic rate. The results obtained indicated that patients with adenoma with hyperthyroidism treated with Lugol's solution responded in essentially the same way as patients with Graves' disease. The results compared favorably with those obtained in a similarly unselected group of cases of Graves' disease observed concurrently.

In 1925, a subtotal thyroidectomy was done for colloid adenoma on a young lady suffering from pressure symptoms. She had no symptoms of thyroid over-activity. The basal metabolism was normal. She had an uncomplicated convalescence for seventy-two hours, when she developed a sudden thyroid storm and died from post-operative hyperthyroidism. Since that time we have given every colloid and non-active adenoma 1 c. c. of Lugol's solution every four hours from five to seven days before operation. Post-operative reactions have disappeared and the patients enjoy a smoother convalescence as a whole.

Lugol's solution has proved to be of distinct value in preparation for operation in all types of goiter. The improvement was greater in cases of Graves' disease, in which there was a drop of 50 per cent of the basal metabolism, while in adenoma with hyperthyroidism there was a drop of 40 per cent.

We believe with Smith, Clute and Strider that the incidence of myxedema in certain cases is due to the administration of iodin after operation to prevent hyperplasia and that a histological study of the thyroid tissue removed showed little apparent correlation between the degree of involution and the basal metabolic rate and clinical pictures. The pre-operative administration of iodin is one of the chief factors in disturbing this relationship.

In our early work, before the pre-operative use of Lugol's solution, it was necessary to resort to stage operations. Sometimes two to five operations were performed in severe cases of Graves' disease. The pre-operative use of Lugol's solution has practically eliminated ligation. However, we find there are a few cases in which an iodin remission is not obtained, and ligation is still necessary. Stage operations were performed more frequently upon long-standing adenomas of adults with cardiac complications, and in cases of hyperthyroidism in children.

Auricular fibrillation was the most frequent heart complication. There were twenty cases occurring in patients with low grade hyperthyroidism of long duration associated with nodular goiter. Periods of transient auricular fibrillation occurred during the first forty-eight hours following operation in a few cases. Normal cardiac rhythm was restored in inverse proportion with the duration of the arrhythmia before operation.

The permanent organization of a thyroid service, staff and nursing team work, careful individual pre-operative preparation, stage operations and an interchangeable technic, so planned that the operation can be discontinued at a minute's notice if the patient is not doing well, have been the chief factors influencing the mortality in this series.

CONCLUSIONS

The basis of sound surgical treatment of hyperthyroidism is early diagnosis, pre-operative management determining the operability, selecting the optimum time and the type of operation.

Rest, iodin and a high carbohydrate diet are the three essentials in the pre-operative management of goiter.

The degree of hyperthyroidism did not influence the end-results. The degree of cure was found to be directly proportional to the duration of the disease. The eight mortalities had

the highest average duration of symptoms in the series.

A 50 per cent iodin remission was found in 8[illegible] per cent of the cases of hyperthyroidism. S[illegible]ge operations were done in those cases that had mild or no degree of involution. Many of these cases were classed as subjective cures because of residual symptoms.

The post-operative basal metabolism is materially affected by the use of iodin before and after operation. The rate in the group before the use of iodin was ten to fifteen points higher than in the group that had received iodin pre- and post-operatively.

The same amount of thyroid tissue should be removed in all types of goiter. Iodin should be given to all types of goiter before and after operation to prevent post-operative storms.

Removal of all the thyroid tissue except just a very thin covering over the posterior capsules to protect the recurrent laryngeal nerves and the parathyroid glands, accurate hemostasis and attention to cosmetic results, are the most important technical factors in the surgical treatment of goiter.

The best results are secured when enough thyroid tissue is removed to produce a temporary hypothyroidism. The remaining portion of thyroid tissue should be kept saturated with iodin for about two months after operation, and all foci of infection should be removed to prevent regeneration of thyroid tissue and recurrence of the disease.

We believe that no single clinical or laboratory test takes the place of the experienced surgeon's judgment as to the operability of each case. Judgment is knowledge plus experience. The big factor is the confidence the patient has in the surgeon. The next most important is the confidence, born of experience, that the surgeon has in himself.

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326 Professional Building.

GASTRO-ENTEROLOGY AS A COMBINED MEDICAL AND SURGICAL SPECIALTY*

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This is the era of specialism in all lines of endeavor. The claim has been made that there is too much narrowing down, but, so long as the specialist can deliver something which cannot be done as satisfactorily by others, and as long as the public demands it, the movement toward continued and increasing specialism will go forward.

The general practitioners represent the main body from which have developed more and more confined and detailed groups. The general practitioner knows something of many subjects. His endeavors are distributed, as the need arises, between medical, surgical and obstetrical conditions. It long ago became evident that there were too many morbid conditions for any one man to know all of them. So, as the first step away from general practice we find the classes of general surgeons, internists (and why not the term general internist to make it uniform?), and the obstetricians.

Then again, separating them still further, we find that certain of the internists have become especially interested in some part of the body or certain diseases, have studied these in greater detail and have supposedly become more proficient in them; and there appear the medical specialties: cardiology, dermatology, gastro-enterology, neurology, and so forth. Some men have confined themselves entirely to their specialty. Others have not abandoned internal medicine completely, even though the bulk of their work is in some special line. With every encroachment on general internal medicine the internist has felt some resentment. In our own specialty the average internist has not felt that there was much need for the gastro-enterologist as a specialist. This belief needs no answer from the stomach specialist, whose work speaks for itself.

Some time ago a group becoming proficient in diseases of women split off from general surgery as gynecologists. In the minds of the general surgeon the gynecologist is still generally

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considered in the nature of a stepson. The general surgeon feels that general surgery can take care adequately of pelvic conditions. That the position of the gynecologist is secure, however, is evident to any one who sees and compares the same sort of work done by the general surgeon and the gynecologist. Then there are the ear, nose and throat specialists, the ophthalmologists, the urological surgeons. As late developments we have the neurological surgeon and the thoracic surgeon. It has always seemed to the writer that the most logical division into specialties was not according to the method of treatment pursued, but rather into various systems or organs with diagnosis and all forms of therapy included therein.

Most of the special branches include both medical and surgical sides of the particular part of the body or system treated. It has been accepted as right that this should be so, as it has had the sanction of years of practice. However, our specialty has remained strictly medical. Nearly ten years ago your Chairman began the experiment of starting to practise gastro-enterology as a combined medical and surgical specialty, being spurred on by the return of three recurrent ulcers in one week, unhealed after having been referred to the general surgeon for operation.

It seemed as if something must be wrong with the surgeon's conduct of ulcer cases and I wondered if the gastro-enterologist with more intimate knowledge of the anatomy, physiologic and pathologic behavior of the stomach should not be able to do more for these patients than the general surgeon who treats conditions from the top of the head to the sole of the foot.

Dr. L. H. Reichelderfer, a surgeon at the height of his career, saw possibilities in the experiment of starting practically a new specialty, and agreed to help me for a period of two years until my rusty fingers might acquire the necessary dexterity, and so we started October 19, 1920.

My object in this paper is to show what is possible in theory and in result when the principles of specialism are applied. Combined medical and surgical gastro-enterology in ulcer, appendicitis and gall bladder disease will be considered as examples.

In the treatment of ulcer much of the progress has been made by discoveries of the surgeon, but on the other hand many of the general surgeons are ignorant or careless in their consideration of the physiology of the digestive tract and of the many important factors entering into the cure of disease apart from the operation itself. It would seem rational to suppose that the gastro-enterologist, already familiar with the particular case and knowing more of the organs involved, were he technically able to do what should be done, would be better fitted to do the operation, and his conduct of the after-treatment would have all the advantage on his side.

The carrying of a case through to completion by one man cannot fail to stimulate in him a greater interest in both patient and disease. It will broaden his attitude toward the advantages of medical treatment, of surgical treatment and their combination. The patient will be the ultimate beneficiary. To the operating gastro-enterologist there is no partiality. It is not a question of which is the best treatment, medical or surgical. But it is a matter of decision in the particular case, whether medical treatment alone will give a fair chance for cure or whether it should be helped out by operation.

Practically, this has worked out. We have been able, as nearly as we can determine, in the last ten years ultimately to secure over 90 per cent cures of gastric and duodenal ulcer, and this with a rather negligible mortality. Two hundred and fifty-four cases have been treated during this time with two deaths.

Gastric ulcer has nearly always been subjected to surgery, followed by medical treatment. An exception to this is made when the ulcer is so high in the stomach that direct attack is not possible. Duodenal ulcer, on the other hand, has usually been given the advantage of a thorough trial medical treatment, unless it is complicated or unless such adequate treatment has been previously tried. The more radical resections are rarely necessary when there is a proper and understanding combination of medical and conservative surgical treatment.

In consideration of appendicitis there are not the same evident advantages for the operating gastro-enterologist. However, in chronic and re-

current appendicitis usually other lesions or functional disturbances are present, as occasionally ulcer, gall bladder disease, Lane's kink or other crippling adhesions or membranes, and more frequently colonospasm or other dysfunction. The diagnostician in the case can most satisfactorily put his finger on the correctable conditions at operation, and can adequately treat the functional disturbances post-operatively.

How these theoretical points work out practically has been proven by a low death rate and by raising the percentage of cure of symptoms. Our policy has been not to operate during an acute attack, unless the patient is seen within 24 hours of the onset, or unless the case is manifestly fulminating in character. It is hard, therefore, to divide our cases into acute, interval recurrent, or chronic; but with far fewer acute cases than other types, we have had 249 appendectomies with one hospital death, and another death, several weeks after leaving the hospital after appendiceal abscess with perforation of the cecum. No cases have died under the pre-operative medical management.

What has been said of appendix disease is even more true of disease of the biliary tract. There is no condition in which specialism, with due attention to pre-operative preparation, technical details and post-operative care, shows to greater advantage over general surgery. In our hospital the total mortality for biliary tract cases which was worked out for the years of 1926 and 1927 was 6.9 per cent. The mortality rate of the general surgeons was 8.3 per cent. Our own death rate was 1.6 per cent, or one-fifth of the general mortality and over the ten years somewhat under 2 per cent.

Hardly less striking is the lessening of morbidity and the shortening of hospitalization. Morbidity has been negligible and the average rate of discharge 13 days, a saving of at least five days per patient over the usual average. End-results in the gall bladder series as a group have been very satisfactory.

I have spoken on ulcer, appendicitis and gall bladder diseases because they comprise the three most usual conditions. Why have I presented the subject? Certainly not to boast of my personal statistics, but to speak for the broad principle of specialization and to prove by unmistakable figures the superiorities of gastro-enterology as a combined medical and surgical specialty over general surgery, or general surgery without closer gastro-enterologic cooperation than usually exists.

It is clearly impossible and inadvisable for most gastro-enterologists, who have for years been established in medicine, to turn into operators themselves unless they have had surgical training. What I do advocate for them is an association with a surgeon, even closer than that which probably exists at present, with a clear understanding that the surgeon's part lies solely in the operative details. Diagnostic study has been made by the gastro-enterologist. Any necessary pre-operative preparation should be carried out by the same man, either alone or in conjunction with the surgeon.

The operation should be performed by the surgeon, but with the attendance of the gastro-enterologist through the entire operation, not only for his possible advice at the time, but in order that he may visualize all conditions present, and then be able rationally to take care of the case subsequently. Immediately after the operation I feel that the responsibility for the patient's care should again revert to the gastro-enterologist and that, apart from the care of the wound and the purely surgical complications, the post-operative diet and detailed treatment which are often the important factors in making for entire success, should be his duty as well as prerogative.

For the young man, however, about to take up the specialty of gastro-enterology, I cannot too strongly urge, as the result of my experiment, his combining the medical and surgical sides of gastro-enterology into one complete specialty. His reward will be in an added love for his work. He will be broadened, tolerant of the weak points and appreciative of the good in both medicine and surgery and his patients will reap the benefit in lessened risks and a higher percentage of cures.

NOTES ON PULMONARY SPIROCHETOSIS*

By GERARD RAAP, M.D.,
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I must ask the privilege of confining my subject matter somewhat closely, particularizing especially on the matter of pulmonary infections due to spirochetes, or spirochetosis. This should probably better be called bronchial spirochetosis, since the distribution of this disease is closely dependent on that of the air passages.

That organisms resembling the spirillum of Vincent could be isolated from the sputum in certain cases of pulmonary gangrene was first demonstrated by Jaffe and Leyden in Holland in 1866. Since that time numerous cases have been reported by isolated workers in almost every country of the globe, but it was Castellani, working in Ceylon, who first published two cases of pulmonary invasion by an organism which he called and classified as a spirochete. It was in 1906 that he first gained the impression that these cases with cough, fever, pain in the chest, hemoptysis, but without the other symptoms necessary to confirm the diagnosis of pulmonary tuberculosis, and demonstrating actively motile spirochetes in the sputum might be considered somewhat bizarre types of Vincent's infection. In reviewing the literature one's attention is drawn to the fact that few of the workers in this subject have had the opportunity of studying more than a few cases, and that as a rule there is a great similarity in the types of cases which each one has observed. By this I mean that one observer has seen several cases of frank gangrene with cavitation and gross changes in the post-mortem findings, while another has seen only such cases as were considered proven when sputum analysis showed spirochetes to be the predominant organism in the sputum. As a result, the subject is not brought to our attention in a manner which properly emphasizes its importance as a differential diagnosis in the routine examination of roentgen films and in the clinical and physical examination of routine cases.

For this reason I call it to your attention today in the hope that we may all realize that there is a certain group of cases in which we feel that the clinical findings may point to the possibility of a chest infection or, stated more broadly, a systemic infection which does not afford us that typical picture which we commonly associate with the bronchitides, pulmonary tuberculosis, abscess and kindred infections.

It is regrettable that not one of us has yet had the opportunity to study one of these cases from its incipiency through its various states to cure or death with the privilege of pathologic study afforded by death from some intercurrent disease. Our closest approach to this means of study lies in the roentgen examination and for this reason we assume the prerogative of trying to interpret some of these films into the pathological processes which we believe underly the changes brought about by this infection and vice versa, to interpret some of the known findings into these studies.

Although one of our cases was an instance of a far advanced gangrene, we have been more interested in the early discovery of the bronchial involvement and its changes. We pause for only a moment, then, to show to what extent the ravages of this infection may go without treatment. The final picture consists of gross necrosis, and includes gangrene, bronchopneumonic consolidation, abscess formation, with the predominating tendency toward further extension, ulceration, erosion of surrounding structures and a process of putrescence which apparently meets with little resistance. These are the cases which we find in the general hospital ward, which have either come in as a last resort or have been treated as pulmonary tuberculosis.

At the opposite end of the scale we find such a history as the following, furnished by Dr. Roche, of Miami Beach, and beautifully succinct in its emphasis:

Mrs. W. R. P., age 31, married, residing in Miami Beach, was examined October 26, 1926. She was confined December 14, 1926, with a normal delivery. General physical examination was essentially negative, except that because of the previous loss of a child at birth, the patient was carefully examined as to heart, lungs and kidneys, all of which were negative. She had had much dental work. She had chronically infected tonsils.

June 4, 1927, the patient was sitting talking with her husband, perfectly at ease and under no strain, when she suddenly felt her mouth fill with a warm, salty fluid which, upon expectoration, proved to be about half a teacupful of bright red blood. There was no history of previous or subsequent bleeding. Careful examination of the chest revealed no abnormality. The patient said she had been having an evening temperature of 99.5 to 100°. Sputum examination showed no tubercle bacilli, but Vincent's organisms. The x-ray

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you may see. The patient is well today except for chronically infected tonsils.

A few cases of this type which intruded upon our attention caused us to review all of the films of this type which we had seen with a view of establishing a few distinguishing characteristics by which we might describe the lesions of spirochetosis.

Possibly we may obtain differentiation by comparison with the lesions characteristic of other diseases, descriptions of which have already been placed on an anatomico-pathologic basis.

In the first stages there is no tendency toward occurrence in the areas of Chauvet in the first, second and third interspaces; but the process may be seen throughout the entire stroma of the lung from apex to base, tending, however, to be slightly more definite in the bases along the lower main-stem bronchi. There is no tendency to infiltration in the periphery until a later stage, but there is a very fine shading away from the bronchial markings, almost equal in quality as we follow it from the hilum shadow to the peripheral minute ramifications. It follows obviously that involvement of the pleura does not occur in the early stages. Calcifications and lymphatic response do not behave as barriers to this infection until secondary infections have changed the entire picture. Admitting the fact that all pulmonary tuberculosis does not follow the classical description as to roentgen appearance, we have, since our attention was called to these cases, seen a few chests in which we felt sure that the diagnosis should be referred to one of these unusual organisms, only to find that the sputum contained tuberculosis. These cases of unusual Koch's infections will serve for another paper, however.

The cases of active influenza which we saw in 1918 are the closest approach to the appearance of early spirochetosis. The later described post-influenza chests showed more definite fibrosis along the markings. I have not seen any cases in which it could be stated that only one side of the thorax was affected. When cavitation has begun or necrosis along the bronchi leads to the differentiation from chronic purulent bronchitis or bronchiectasis, then in spirochetosis other changes have also occurred in the parenchyma which allow us to conclude that the pathology must be more than a simple non-specific infection.

The earliest lesions occur as acute bronchitides, with a tendency toward the same putrid lesions as are seen in oral disease of this type. Buday observed such a case at necropsy in which necrosis was limited to the superficial mucous membrane. Microscopically it is described as a mononuclear infiltration which tends to be somewhat more marked in the interstitial structures at first, later migrating into the adjacent blood vessels, and producing ulceration of the mucosa with extension into the alveolar structures. When this extension into the parenchyma is sufficient to produce any change at all in the films, then we find it all of the same quality, and not of varying density as in tuberculosis. In sharply defined films, it is also noticeable that there are no changes evident in the bronchial bifurcations such as we commonly associate with calcific response.

Further than to point out these few details which have caused us to wonder whether it is really possible to define these changes at an early stage we cannot go until better opportunity has been afforded to study the pathologic processes of the early cases and to make a close comparison between the appearance in the films and the microscopic section. Until such a time we may all still say of a case, "Not typical of tuberculosis nor any other of the common pulmonary infections. Examine the sputum further."

For treatment of these early cases, we began with arsphenamine alone and were somewhat dissatisfied with our results in a few cases. A combination of arsphenamine, with quinin iodobismuthate intramuscularly and, of course, efforts at eradication of all infected lesions about the teeth, has resulted in apparent cures in all the cases reported except the first one, of which we have the autopsy record to prove the diagnosis.

Our purpose in this resume is to bring to your attention the fact that no sputum should be examined microscopically without due attention to organisms other than tubercle bacilli, and to ask for the cooperation of the roentgenologist in the solution of another problem in chest disease.

MATERNAL MORBIDITY AND MORTALITY*

By PERCY W. TOOMBS, M.D.,
Memphis, Tenn.

In the history of mankind there has been no more sublime and merciful art than that of obstetrics. It is as old as the dawn of history, but in no other field of medical science can we boast of or rather bewail the same long dark centuries through which it has passed with its incomputable toll of human life.

Modern obstetrics must be regarded truly as a superlative endeavor, but to no other problem in practice have such minor, if not indifferent, methods been applied.

In humanity's never-ending battle against the ravages of disease and the cold embrace of death prevention has occupied a regal position, so much so that the science of medicine is regarded as devoted largely to preventive means. In the high perfection of the science in this our day, obstetrics is ascending to its proper place with its sister branches and the profession at last, though tardily enough, is beginning to realize that in this particular field of endeavor one finds the greatest of all opportunities to profit by prophylactic practice.

The late George Clark Mosher once said: "It is the individual who dies; there is no mass mortality in obstetrics until the records are filed." I shall not, however, burden you with a resume of dry statistics, as their recapitulation in reference to facts with which we are all familiar is wearisome and time-consuming. The toll taken in maternal deaths is almost staggering, to say nothing of maternal morbidity. The yearly maternal death rate from childbirth in the United States is comparable to the destruction of a city of considerable size and a city wholly composed of individuals of mature and useful years.

In this Country one mother out of every 150 dies in labor or shortly thereafter. If those who succumb to the complications of pregnancy were included, and if all the facts connected therewith were unqualifiedly recorded, it would not be far amiss to claim that one patient out of every 145 or 150 dies of the complications of pregnancy or the accidents of labor.

Statistics compiled by the Children's Bureau, Department of Labor, indicate that of the more than 2,000,000 full-term pregnancies occurring in this Country annually, nearly 25,000 of the mothers succumb.

Tragic as the mortal aspects of maternity may be, the certificate of death covers only an insignificant fraction of the toll exacted by childbirth. The statistics of disease, morbid statistics, are still more tragic.

For every patient who succumbs it does not seem too much to claim that ten are seriously ill or, in other words, that the annual puerperal morbidity in this Country totals less than 250,000.

Viewing the statistics in their broader geographical sense, one may safely assert that the total number of women who die from complications of pregnancy and labor throughout the world yearly is almost beyond comprehension. With a population of nearly two billion (1,748,000,000) the annual death rate, all things considered, must reach or exceed 500,000.

The medical profession is indeed alive to the grave condition which these figures reveal. There is considerable indication also that the laity is becoming increasingly conscious that the next generation is being produced at a fearful cost to the women of this one. During the nineteen months that the United States was at war there were almost as many women who died in producing citizens to enjoy the benefits of democracy as there were soldiers who gave their lives to make the world safe for democracy. Science bends its energy to make war terrible and deadly as time passes. Would it not be as well to be as diligent in attempting to render maintenance of the population a trifle less hazardous and fatal?

In addressing the members of this distinguished body I feel that I am talking to a group of men who represent all branches of the medical profession. It is true that many of us are established as specialists in the various fields of medicine, but after all we are practitioners of medicine, and it is as such that we should consider the problem at hand.

Most of the statistics in respect to puerperal morbidity and mortality are compiled at lying-in hospitals, although the Government compilations present the returns in vital statistics of the poplation at large. It should not be forgotten that the maternity hospital is the dumping-ground for all desperate cases, for to it are sent the

*Clinic, General Clinical Session, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

failures and mistakes of midwives and physicians in private practice. Therefore, it is not surprising that their record of death and disablement after obstetric surgery is a black one; it could hardly be otherwise. But when we leave the walls of maternity hospitals we do not witness any great improvement.

What, then, are the conditions mainly responsible for morbidity and mortality? Of the manifold factors accountable there are three that stand out conspicuously, namely: septicemia, toxemia, and hemorrhage. These, standing in the order named, may be regarded as the great morbid lethal triad of childbirth. Brooke Bland, in a recent article of merit, states that of all the deaths attributed to childbirth septic infection claims more than one-third and, hence, by far the largest number of victims. This writer thinks that the conditions in the main responsible for this are: first, inadequate pre-natal care; second, indiscriminate vaginal manipulation; third, injudicious implemental delivery; fourth, alluring operative delivery; and fifth, the failure to appreciate the transcendent value of the Garden of Eden plan.

Two features bearing on the causes of morbidity and mortality are lucidly portrayed in the preliminary study of maternal deaths in Massachusetts during the year 1922-1923. This study shows that preventable disease was responsible for 58 per cent of the deaths; and still more impressive is the statement that operative delivery of some sort was employed in 591, or in more than 50 per cent of the 984 deaths recorded. This report discloses that over 52 per cent of the patients had less than three months of so-called ante-natal care. If one accepts the standard of the Children's Bureau involving ante-natal supervision from the fifth month onward, the study shows that only 11 per cent of the patients were properly cared for; in other words, that 89 out of every 100 were allowed to pass through their pregnancies without pre-natal care.

In regard to vaginal examination it is believed by many that 75 per cent of the cases of sepsis are associated with repeated internal examinations and various injuries. Infection is exogenous in origin in probably 99 patients out of every 100. Digital or implemental manipulation almost invariably leaves in its wake a very definite proportion of mortality and a far greater amount of morbidity and ill health. It entails the danger not only of directly conveying infection to a patient readily susceptible to infection, but vaginal manipulation, manual or instrumental, is in many instances associated with tissue trauma. I venture the opinion that vaginal examination, unless performed by those familiar with the technic,indubitably favors trouble and that if the rectal method were given precedence not only in institutional practice, but especially in general obstetrical work it would contribute in a large way towards diminishing the inordinately high morbidity throughout all sections of the Country.

Concerning the subject of implemental delivery too much cannot be said. James Handry, Professor of Obstetrics at Glasgow University, at a meeting of the British Medical Association in 1928, remarked that in the study of 558 cases sent into hospitals because of failure to deliver by forceps, he noted:

"In 151 no abnormality either of fetal or maternal parts existed. The forceps had been applied before the cervix was fully dilated. It was not that the presentation made delivery difficult or impossible; it was merely that labor was proving too slow."

We must agree that the application of forceps before complete dilatation of the cervix is a most dangerous procedure, yet we see how often it appears to have been practised. Efficient ante-natal care should identify the cases when labor is likely to be protracted and dilatation slow, but it is only effective teaching which can prevent the too early application of forceps in normal cases.

The fourth condition mentioned, namely, cesarean section, I shall not attempt to discuss in detail. I ask your indulgence, however, while I quote a few excerpts which bear upon the general subject I am discussing. Bland, in the paper to which previous reference has been made, says:

"The mortality from cesarean section in the cases recorded was 88 per 1000. Of 100 deaths following abdominal deliveries which formed the subject of special study, 30 per cent were caused by septicemia."

Shaw, in a recent article relative to a series of unsuccessful forceps cases brought into British hospitals, said:

"In the last twenty years the number of cesarean sections performed in each unit has enormously increased and the first thought on seeing these figures is that many of these children could have been saved by this operation. In considering this alternative treatment we must remember in the first place that the majority of these children were dead or badly damaged when the patient was admitted to the hospital, but a small number were alive and were deliberately sacrificed to save the mother."

J. Whitridge Williams, in an address before the alumni of Sloane Maternity Hospital, in the light of recent statistics, said:

"Do such results mean that the women of forty years ago were possessed of a tougher fiber than at present? Or do they mean that in our current practice we are unwittingly sacrificing the mother for the sake of the child, or that some of us are possessed by an uncontrollable furor operandi which takes little thought for the welfare of the mother? I am convinced that the latter is the case in many parts of the Country, especially outside the conservatively managed teaching clinics, and I know in some of the smaller hospitals with so-called open services many unnecessary operations are constantly being performed with an appalling sacrifice of maternal life. Furthermore, I have suspicion that a considerable fraction of the excessive risk in childbirth which characterizes this Country is due to unnecessary resort to cesarean section by those who do not realize its dangers and limitations."

In an address last year on "The Abuse of Cesarean Section," I expressed the same sentiments. No way has yet been worked out by which babies can be manufactured and sold cheaper and better than those produced by old-fashioned methods, and cesarean section should not be considered a short cut.

The third factor looming high as a cause of mortality is hemorrhage. This is mainly of the ante-partum type, about equally divided between premature separation of a normally implanted placenta and placenta previa. The majority of the former are probably due to toxemia and may largely be overcome by preventing or treating its basic cause. The mortality of the latter, placenta previa, may be reduced to a small percentage if one appreciates the significance of symptomless bleeding in its early stage.

These, then, are the principal conditions responsible for the high rate of maternal morbidity and mortality. What solution can be offered to lower the rate?

The population most in need of good obstetric care is the so-called middle class, with small and limited income, but with sufficient intelligence, education and refinement to desire and appreciate good medical attention and privacy during illness. Such persons cannot afford expensive private rooms in hospitals nor the services of specialists nor high-priced trained nurses. Our large hospitals greatly lack moderate priced accommodations for such patients. This class naturally consults the general practitioner, who oftentimes undertakes confinement in apartments or private houses without proper facilities, with more or less bad results as regards the health and strength of the mother and child.

It is the so-called family physician who really has the opportunity to lower the maternal morbidity and mortality rate by the practice of good obstetrics, and to do this he must have proper training. To assure this type of practitioner, the proper teaching of clinical obstetrics should be carried out in the schools. If this is done, the graduate of the future will be turned out capable of taking charge of normal cases, of recognizing abnormalities and of treating minor ones and with a sound clinical foundation upon which to build with future experience. If the family physician, who cares for at least 80 per cent of pregnant women, will give them antenatal care, diagnose carefully the presentation and position, be meticulously aseptic, avoid unnecessary intervention, especially in occiput-posterior positions, never do an operative delivery before complete cervical dilatation, and at all times appreciate the dignity and high demands of obstetrics, the maternal and baby mortality will drop at once. We are not likely to see a great reduction in the present distressingly high rate of maternal mortality until we witness a return to these "first principles" and surgery recedes to its older position as an aid only for the most serious emergencies, to be employed after due consideration and consultation.

If there is to be any reduction in maternal mortality there must be a more widespread knowledge and a clearer understanding of the importance of the principles underlying proper obstetrical care. The application of these principles in preventing fatalities as well as morbidity must be known to the medical profession and also to the public. If the medical profession as a whole makes a determined stand for better obstetrics all along the line, the question of too much surgical interference will take care of itself. With proper supervision of the pregnant woman the lives of many mothers would be saved who are otherwise sacrificed upon the altar of maternity.

Ours is a true and noble calling. Genius dominates and inspires our science. It interests each of you whether you be an humble practitioner unostentatiously performing your arduous duties in some small town, or whether you be some specialist of fame in the crowded metropolis.

May we as relief bearers to our fellow creatures, catching and upholding the sublime and merciful art of midwifery, be of "that noble type who live not for self alone but the good of all"; become imbued with hope and faith

and be made stronger and fresher to battle for the amelioration of suffering and the prolongation of human life.

The most skillful obstetrician of all is Nature herself.

899 Madison Avenue.

PRESENT STATUS OF RADIOLOGY*

By J. M. MARTIN, M.D.,
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Comparatively speaking, radiology is a young specialty, the youngest in the medical field today, having been born in 1895, about thirty-four years ago. It grew slowly and uncertainly until 1900, when it graduated from the static machine to the induction coil, which gave it a little boost. Well do I remember the scramble for coils and just how badly I was stung in my first purchase. This product from the misdirected mind of some pseudo-aspirant to electrical fame bore the name of "Kinraide" and was manufactured in the City of Brotherly Love. It was absolutely worthless. I finally disposed of the thing for about $50.00 in a trade with a local firm dealing in physicians' supplies. A prominent physician in Texas bought the coil and was probably cured of his desire to become a radiologist. He has made a success in other fields, so the thing probably did some real good after all. The coil was an improvement over the static machine, but it had its limitations mainly because the interrupters were a source of endless trouble. It was not until after the invention of the interrupterless transformer and Coolidge tube that the new penetrating ray began to take its place in medicine and surgery as a mighty agent, valuable alike in diagnosis and treatment of obscure and difficult diseases.

Today, little more than a quarter of a century since the x-ray was discovered and named by Roentgen, it is used extensively by every civilized nation on the globe. I am not quite sure of this statement because statistics are not available, but I will venture the assertion that more money has been spent for x-ray and radium equipment by private physicians, clinics and hospitals than has been spent upon any other specialty four times the age of roentgenology. When we stop to consider the universal application of this invisible ray we are reminded that it is indispensable to every branch of medical science.

Because of the general application of radiology the specialist in this branch must qualify himself for its application to the various departments of medicine and surgery. After struggling along through adversity from an inconspicuous beginning the roentgenologist is gratified to see that his specialty has been given general recognition and he is now placed on an equal footing with other and older departments, as evidenced by sections on radiology in this Association, the American Medical Association, and the many state medical organizations.

Radiology has developed rapidly and broadened its field of usefulness to where it is now covering so much territory that one man can hardly hope to become equally well trained in its possibilities or skilled in its application. Already physicians are restricting their work either to diagnosis or therapy and in time these divisions will probably be subdivided. This is as it should be because the more we concentrate on a definite line of work the more expert we become.

As a specialty, radiology differs materially from other specialties. The radiograph is a visible product of work done and as such it is subject to inspection and open to commendation and criticism. The radiograph speaks for itself and the standing of the radiographer will depend upon his ability to furnish the kind of service required.

The radiologist, to be successful, must be a thoroughly trained physician; about this there is no argument. He may, of course, have one or more technicians to assist him in the same capacity that a nurse in the operating room assists the surgeon, but he must superintend all radiographic and therapeutic work, dictate a report on all radiographic and fluoroscopic examinations and make a signed report to the physician in charge of referred work, a copy of which he must keep on file. In my opinion, all radiographs are the property of the radiologist and should be kept for a reasonable time where they can be immediately found when needed by the physician in charge or by industrial institutions having the work done.

We are hearing a great deal just now regarding the high cost of medical service. Only two classes seem to be able to obtain the kind of

*Chairman's Address, Section on Radiology, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

medical attention they need: these are the very rich and the very poor. The average middle class individual is unable to pay for hospital and medical services when protracted illness overtakes him or members of his family. In line with this the radiologist is frequently accused of profiteering by overcharging the class who are unable to pay standard prices. This accusation is often unjust, because I am in a position to know that the radiologists in my section of the Country are always willing to give the patient who is in moderate circumstances reasonable consideration. It is not generally known by physicians in other specialties that an x-ray and radium equipment that will meet all of the requirements of the several classes of work in which the roentgenologist is particularly useful costs many thousands of dollars. The office space necessary to house such an equipment is an added overhead that must be reckoned with. Qualified office assistants will swell the pay roll each month, while books and magazines relative to the several specialties must be given a place in the budget each year. Finally the time and money spent in attending medical meetings of which there is no end, almost bankrupts the radiologist.

The radiologist is not a mere laboratory worker. He is a consultant and his judgment and opinion based upon his findings, when correlated and compared with the clinical history, are of material benefit in every case. Of course, it goes without saying that the value of his opinion must always depend upon his training, ability and the thoroughness with which he has studied and examined a case, and not primarily upon the amount of time and material used in making the examination. A novice might use $25.00 worth of material and spend several hours of his time in making an examination and know nothing of particular value about the case after he had finished. The radiologist who wishes to confine himself to the radiographic or fluoroscopic findings without knowing anything about the clinical history of the case will find himself occupying a restricted field which will grow narrower each year until he will finally be crowded out by the men who are more than laboratory workers. The average physician who refers a patient to a radiologist for an examination is in trouble and he is very grateful for any suggestions that will help him successfully to diagnose and treat the case. For this service the radiologist should be paid a reasonable fee.

New equipment of superior quality is being brought out at a rapid rate and the progressive radiologist finds himself taxed to the limit of his financial recourses about once every three years for new and up-to-date apparatus.

The surgeon may and often does receive a $1000.00 fee for an operation performed in a hospital where everything is furnished, while the radiologist whose time and opinion were required to establish the diagnosis was probably paid a fee ranging from $10.00 to $35.00. On many occasions a radiologist performs a service for a deserving patient for a fee of $10.00, which may or may not cover the actual expense incurred, while often a poor widow or a penniless sufferer receives our services without charge. Physicians, as a rule, are fair-minded and willing to carry their part of any burden, but too often we have cases referred with a request that a very low fee be charged for our services, while the referring physician charges the same poor (?) patient the regular fee for his services. Then we have a limited number of physicians who regularly send members of their family to one radiologist for examination and treatment while they refer all or the greater part of their work to a cut-rate laboratory or to one that pays a commission for work referred. Another menace to public safety and a reflection on the ancient ethics of an honorable profession is the practice of several physicians who club together for the purpose of buying a small x-ray machine with a meager equipment for doing their own work. Usually they offer the services of the place to other physicians at cut-rate prices. The attendant is often a girl with only a limited knowledge of the rudiments of radiology. She is expected to make the diagnosis or the attending physician makes his own diagnosis. The public suffers as a result of practices of this kind because the service is always inferior and sometimes dangerous. As might be expected, the public is rapidly coming to realize that such side issues are but catch-penny devices and the pseudo-x-ray laboratory is beginning to be a boomerang and an expensive experiment for its owners. The radiologist could just as ethically employ a cheap girl to take histories, do minor surgery, treat children's diseases, do eye, ear, nose and throat work or other classes of work with about the same general results. Every x-ray equipment used for medical purposes should be in charge of a trained radiologist. Anything short of this smacks of quackery and brings disrepute on its promoters.

This address must not be understood to be in the nature of a complaint. A knowledge of and a plain discussion of existing conditions will put the radiologist in a position to meet all kinds of unqualified competition from whatever source it may come.

The average intelligent patient has learned that he cannot hope to obtain dependable service from questionable sources and he is not often going to be duped by those doing inferior work, even though the prices are attractive. When he is ill he wants the best attention that is available, and he is willing to pay a reasonable price to get it.

Unquestionably, the cost of medical service is generally too high. It costs the individual on a moderate salary more than he can afford to pay to secure the services of physicians of national reputation either in their homes or in a hospital.

We are reading much in the lay press and medical journals and are hearing similar ideas expressed by politicians in public office, regarding the coming of state medicine. Of course, there are two sides to this question and I am not prepared at this time to discuss either, but in closing I want to leave this thought with you. Municipal or state control of medicine will, in my judgment, degrade a noble calling so that it will become the plaything of politicians who will place it on a purely commercial basis. Fortunately for all parties concerned, we have not come to that point yet, but, if it ever does come, the medical profession will in the main have itself to blame. In order to neutralize the tornado of adverse public opinion that is now raging throughout this Country regarding the high cost of medical service to those who are unable to pay and live comfortably on their present income, the physicians of this Country should, through a central body, organize an educational campaign committee. This committee should be composed of trained and experienced lay and professional men from various parts of the Country. Every phase of medicine from the viewpoint of the physician and the public should be carefully studied until an understanding satisfactory to all parties concerned is reached. Unless we can become a unit among ourselves and work to a definite, practical end to regulate the cost of medical services for those who are unable to pay the present price, we may expect sooner or later to have state medicine forced upon us. If we sit idly by and wait for this unhappy time it will then be too late to reform our present methods and the physicians of this Country will suddenly wake up to the fact that they are under the control of a central body which, in its simplest terms, is nothing more than a political organization, unorganized.

Radiologists, as a rule, are reasonable in their charges, but if there be any in this organization who are demanding and receiving fees out of keeping with the services rendered it is high time that adjustments are made.

May I indulge a hope that this organization will be a unit in supporting a national movement to bring about an agreeable understanding between organized medicine and the public?

THE VALUE OF BISMUTH-VIOLET THERAPY IN OTO-RHINO-LARYNGOLOGICAL PRACTICE*

By J. L. SANDERS, M.D.,
Greenville, S. C.

Wilkinson and Barksdale have demonstrated the bactericidal properties of bismuth-violet (hexamethyl-triamin-triphenyl-carbinol - chlorid . . . bismuth) *in vitro* and in the prevention and treatment of certain infected wounds. The findings of these investigators have shown that the following organisms are killed *in vitro* by the dye in the following dilutions:

Organism	Dilution
Staphylococcus albus, aureus and citreus	1 : 1,000,000,000
Streptococcus pyogenes	1 : 1,000,000,000
B. coli	1 : 1,000,000
B. typhosus, B. paratyphosus A & B.	1 : 100,000
B. tetani and spores	1 : 100,000
B. welchii and spores	1 : 100,000
B. Anthracis and spores	1 : 100,000

These investigators have also observed that the Gram-positive organisms are more readily destroyed by the germicide than are the Gram-negaitve organisms and that B. pyocyaneus is not killed in any strength of the dye, without the addition of 75 per cent ethyl alcohol. All organisms present on the normal skin have been killed after painting it with a dilution of not over 1 : 10,000. The matter of lowering surface tension in the solvent of the dye has also been taken into consideration, and the strength used in the following series was a 0.4 per cent solution of the dye in from 10-20 per cent glycerin in water. It has been shown that this dye is non-toxic, and that sufficient quantities may be administered intravenously to impart a purplish

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color to the skin without any reaction injurious to the patient.

The purpose of this paper is to give briefly my experience with this new therapeutic agent in the prevention and treatment of various infections of the nose, throat, ear and accessory sinuses, including the mastoid cells, in a series of over 100 cases. The conditions treated were streptococcic throats, acute and chronic infections of the frontal sinuses and antra, post-operative mastoidectomy, otitis externa and otitis media.

The best results have been obtained in the acute infections as one would readily surmise, because the organisms had not yet invaded the mucosa and were more readily brought in contact with this triphenyl-methane dye. Chronic infections were materially aided to recovery. The first improvement noted was the cessation of purulent discharge, and the disappearance of the putrid odors emitted by the discharge. With the cessation of the pus formation, a sero-sanguinous discharge became manifest, which kept up until final recovery, which in many cases did not take place until the patients had been under treatment for a number of weeks.

METHODS OF TREATMENT

Acute Infections of the Throat.—There were ten cases of streptococcic sore throats in this series of cases. The routine practice was to swab the throat thoroughly with bismuth-violet solution daily until two or three treatments had been given. The plugs were thoroughly removed when they were found in the tonsillar tissue, and the dye was applied copiously with a cotton swab to allow free ingress into the crypts of the tonsils. The results were uniformly a marked arrest of the infection, although, as might be expected, where the tonsil crypts were closed, the beneficial results were not so marked.

Bismuth-violet has also been found to be of value in treating infections that occur in the tonsillar fossae following tonsillectomy. My practice has been to apply the dye once or twice routinely in the post-operative period. This is usually followed by epithelialization of the raw surfaces.

Acute and Chronic Infections of the Frontal Sinuses and Antra.—The first step necessary is to establish good drainage from the infected sinus, either by puncture or other means. At the time of puncture, the purulent discharge is washed out with sterile physiological salt solution, after which a few cubic centimeters of the 0.4 per cent bismuth-violet solution are injected into the sinus. This treatment is given daily, and usually with the second or third treatment there is a cessation of purulent discharge. It is replaced by an odorless, sero-sanguinous discharge, which gradually diminishes.

The treatment of chronic infections of these sinuses is similar to the treatment of the acute infections, but more time is required for the arrest of the disease process.

Case 1.—Mrs. H. J., a housewife, age 38, had complained of severe headaches over a period of three months. Intranasal examination revealed the presence of pus in the left middle meatus, and after further study, including complete x-ray, a diagnosis of infection in the left frontal sinus, ethmoid and antrum was made. This patient had previously had the tip of the left turbinate bone snared off by another operator, without any relief. Operative treatment consisted of antral window, ethmoid exenteration, and opening of the left frontal sinus through the intranasal approach to establish drainage. After washing out both sinuses with physiological salt solution, a 1 : 2,000 solution of acriflavine (neutral) was injected several times in succession, but no improvement in the patient's condition was noticed, either subjectively or objectively. In the face of this failure to clear up the condition, it was decided to employ the bismuth-violet solution to determine its efficacy. The sinuses were again washed out with physiological salt solution, and the new drug was instilled. Treatments were given every other day in this case. After the fourth day there was no pus in the washings, and there was a rapid improvement. After two weeks the patient felt perfectly comfortable, although she was not discharged until she had been under treatment for about four weeks. There has been no recurrence up to the present time. There are fourteen other cases of similar nature in the series of patients treated in this manner. It may be added that the recovery of the acute cases of the series has been more rapid than that of the chronic ones.

Post-Operative Care Following Mastoidectomies.—In a series of ten cases of mastoidectomy, the routine practice has been to employ this new germicide immediately following the exenteration of the mastoid cells, and to apply the bismuthated triphenylmethane dye at each redressing of the wound. The treatment has been most satisfactory, and each time the infection has disappeared provided the germicide has had direct contact with the infecting organisms. It has also been uniformly observed that the amount of granulation tissue has been at a minimum following bismuth-violet therapy.

Otitis Externa.—There were ten cases of otitis externa in the series. Thorough mechanical cleansing of the inflamed areas, by an application of hydrogen peroxid solution to remove all scabs and incrustations, was first resorted to, then the dye was applied to the part and allowed to dry. The patients were directed to return two or three days later, when usually the infection was found much improved. In many cases a re-application of the dye was unnecessary, although it was the practice to reapply it as a prophylactic against further infection. Where furuncles existed, the small abscesses were opened after thorough cleansing and disinfection of the lining of the external auditory canal. The pus was thoroughly evacuated, and the bismuth-violet introduced into the cavity.

Case 2.—Mrs. H. G., age 19, a housewife, had had a rather severe inflammation of the outer ear for the previous three months. Examination revealed an extensive infection of the lower half of the ear, with raw and denuded areas. She had been treated by various methods, but no improvement had been experienced. Instead of getting better, the infection had shown a tendency to spread and become worse. The inflamed area was thoroughly cleansed with application of hydrogen peroxid solution, followed by an application of the bismuth-violet. This was allowed to dry and then covered with zinc oxid ointment. This treatment was given three times weekly. After the first treatment some improvement was observed and after the lapse of two weeks the patient was discharged as cured. Twenty cases of this nature were in the series; no recurrence of the external otitis has been noticed in any case that came for treatment until pronounced cured.

Purulent Otitis Media.—In both acute and chronic cases my routine is to boil the canal out with hydrogen peroxid until it is thoroughly clean, dry with sterile cotton, and introduce three or four drops of bismuth-violet, placing a pledget of sterile absorbent cotton in the canal. In acute cases this is repeated daily until discharge ceases; in chronic cases the frequency of treatment is governed by the amount of discharge and the response to treatment. The results were gratifying, and the course of disease was greatly shortened in all cases treated in this manner.

Case 3.—Mr. H. P., age 21, a student, had complained of a discharging ear of about one year's duration. Examination revealed an opening in the drum, through which pus was escaping. The external canal walls were irritated. This patient had formerly received irrigations with boric acid solution, with no relief. All aqueous irrigations were prohibited, the ear was cleansed thoroughly daily with hydrogen peroxid, thoroughly dried, and a few drops of bismuth-violet were introduced with a dropper. I saw him twice a week for two weeks, allowing him to carry out daily treatments between visits. At the end of this period there was no discharge present, and the canal wall had a normal appearance. There has been no recurrence in three months' time.

Other chronic ears in this series have been materially improved by this treatment, and results are uniformly satisfactory. Where granulations were present, these were removed, epithelialization was rapid, and granulations have not recurred in any of the cases that I have observed.

DISCUSSION

In a series of over one hundred cases of infections of the ear, nose, throat, and accessory sinuses, bismuth-violet has been used with encouraging results. More attention is being paid each day to the use of harmless, non-toxic, anilin dyes. This drug has been found to be of value in treating both acute and chronic infections of the throat and accessory sinuses, in the prevention and arrest of infections following mastoid operations, also in treatment of infections of the external and middle ear. The results obtained in this series of cases have been of a nature to warrant the routine use of this drug. Many of the anilin dyes have a toxic action, but no toxic effect has been observed following the use of bismuth-violet. The drug investigated *in vitro* by Wilkinson and Barksdale has been found clinically useful in the infections mentioned above. Observations on the treatment of other infections will be made. Further studies are in progress.

I am indebted to the Table Rock Laboratories, Inc., of Greenville, South Carolina, who, by furnishing the drug, made these studies possible.

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PRELIMINARY REPORT ON PATHOLOGICAL CHANGES IN THE ALBINO RAT SUFFERING FROM VITAMIN G DEFICIENCY*

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and
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It is now generally recognized that vitamin B is a complex, composed of at least two dietary factors, one relatively labile, which will prevent and cure polyneuritis in pigeons and rats, known as the anti-neuritic vitamin; and the other, relatively stable, which will prevent and cure pellagra-like symptoms in the rat, designated as the anti-pellagric vitamin. Both of these vitamins are essential for growth in the rat. The nomenclature of the stable factor† is at present confusing. It will be referred to in this paper as vitamin G.

Pellagra-like symptoms in the rat have been reported by Goldberger and Lillie,[1] Chick and Roscoe,[2] Hunt,[3] Salmon, Hays and Guerrant,[4] Sherman and Sandels[5] and Findlay.[6] The dietary regime for the production of such avitaminosis has not as yet been standardized, each investigator using his own technic. To date we have produced dermatitis in 20 animals suffering from vitamin G deficiency on various types of rations, but the following technic developed by one of us (B. S.)‡ was found to yield optimum results. The diet is composed of: casein§ (purified) 20, salts (McCollum's 185) 4, agar-agar 2, butter fat 5, dextrin 69. A daily supplement of six drops of cod liver oil per animal per day supplies an abundance of vitamin D. Albino rats four to five weeks old, weighing 50 to 90 grams, are transferred from stock diet No. 1[7] to the above ration, each animal being placed in a separate compartment on raised screens. They are weighed weekly until there is depletion of the vitamin B complex, characterized by cessation of growth or decline of body weight. From that period the animals are weighed daily and daily records of food consumption and symptoms are noted. This period of depletion, depending on amount of vitamin storage, generally takes from two to four weeks. A daily portion is now administered of 500 milligrams of rice polish to each animal to furnish a liberal supply of the anti-neuritic factor, vitamin B. The rice polish is irradiated for 10 hours with a mercury quartz vapor lamp, according to the suggestion of Hogan and Hunter,[8] in order to destroy the greater portion of vitamin G. The dermatitis is produced in 36 to 50 days following the administration of the irradiated rice polish. Recently it was found that the onset of the skin lesions can be somewhat expedited by irradiating the casein of the ration as well as the rice polish for 10 hours.

We have now collected material for histopathological study from 20 animals with dermatitis, from 22 animals without dermatitis in which cessation of growth caused by vitamin G deficiency has been produced, and from 16 controls on adequate diets containing an abundance of the G factor. Therefore, in this preliminary commmunication our observations are based on 58 animals.

The typical symptoms of vitamin G deficiency are loss of weight, diarrhea and priapism. The urine is chromogenic. When the dermatitis occurs the hair is usually roughened and thin. Eschars appear in the regions of alopecia averaging 1 to 4 mm. in diameter. The eschars are brownish red, raised and dry with irregular edges. When removed there is a moist, depressed surface. The lesions are usually bilateral. They are present mainly on the side and the top of the head, forepaws, shoulders, jaws and around the eyes. Whether all of the lesions and the alopecia are caused by scratching is uncertain. There is congestion of the small intestine, especially the ileum. Body fat has practically disappeared. There is often frothy, light brown feces in the small intestine, particularly the ileum. In some animals there is loss of tonus of the gastro-intestinal tract. In two rats hemorrhage occurred in the ileum.

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*Read in Section on Pathology, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

*From the Departments of Medical Pathology (Little Rock), and Agricultural Chemistry (Fayetteville), University of Arkansas.

†The nomenclature of the stable factor associated with the vitamin B complex, a deficiency of which produces pellagra-like symptoms in the rat, is at present very confusing. The letter "G" has recently been adopted by the Committee on Nomenclature appointed by the American Society of Biological Chemists. The British biochemists have provisionally adopted the term "B_2." Most probably the letter "F" will be finally adopted to represent the dietary factor in question, as suggested by Hogan and Hunter[8] and by one of us (B. S.)[9].

‡Research paper No. 141, Journal Series, University of Arkansas.

§Purified by washing for a week in acidulated distilled water.

The tissues were fixed in formalin and in Zenker's solution. They were stained with hematoxylin and eosin and Wolbach's modification of Giemsa's stain was used. The usual microscopical pathological changes in the skin indicate an acute inflammation with necrosis. There is frequently a region of necrotic material resting on depressed epidermis. The epidermis has often disappeared. Inflammation has extended into the corium, tela subcutania and sometimes involves the muscle. Cells of the lymphocyte series and polymorphonuclear leucocytes are present. In other sections the typical granuloma extends deep into the muscularis. Hyperkeratosis is present usually on either side of the ulcer. Where the epidermis has not disappeared there is hyperkeratosis of the remaining epithelium. It may be present without relationship to an ulcer. Regions of parakeratosis are not infrequent. Changes in the thymus indicate involution. In several sections of the stomach there are collections of eosinophilic polymorphonuclear leucocytes and a few cells of the lymphocyte series in the submucosa and sometimes extending between the glands. This condition occurs in some of the stomachs of the control animals, but not to the extent that it is present here. These cells are more prominent in the rumen, which is lined with epithelium. In one section of the rumen there is an ulcer; in another, there is a small abscess. The spleen is decreased in weight. Atrophy is indicated by increase in fibrous tissue and decrease in cells of the parenchyma. Fatty metamorphosis occurs in numerous sections of the liver, varying in amount. There is active spermatogenesis. There are no noteworthy microscopic pathological changes in the tongue, kidneys, lungs, heart, thyroid gland, submaxillary gland, skeletal muscle, pancreas, aorta, trachea or esophagus. Although most of the changes noted are those reported in the literature on inanition, the majority of animals in which we have produced an inefficiency accompanied by dermatitis have consumed food comparable to our controls. There is, however, ulceration of the skin and a tendency for ulceration elsewhere.

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THE SOUTHERN MEDICAL ASSOCIATION IN SOUTHERN PUBLIC HEALTH WORK*

By E. L. Bishop, M.D.,
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During the past two decades the Southern part of the United States has experienced a larger growth and development of public health service than has occurred in any other section of the Country. We have made substantial progress in the solution of our peculiar public health problems and have developed a system of administrative practice in most instances well adapted to our governmental organization and our political economy. Beginning with special studies and control procedures in hookworm disease, the scope of operations has rapidly extended to comprehend typhoid fever, other filth-borne diseases and malaria, until we have come to the realization that there must be provided a system of public health administration that will deal with the whole of our public health problem rather than with one or a part of its elements. As a result of this point of view, state departments of health have been materially strengthened, we have gone far in the strengthening of local health service and in the development of local health departments under trained leadership. Indeed, sufficient progress has been made in the development and application of new principles of administrative practice, particularly in rural health work, to attract the attention of the entire Country and of other countries. Some writers have been pleased to say that constructive leadership in public health administration is passing to our section of the United States. We have been fortunate in that we have had public health problems which are more readily soluble than is the case with the problems of some sections of the Country, and that we have a local governmental organization on which we can usually build reasonably satisfactory local health organizations. The fact that we have made some progress, however, should not result in a state of mind that

*Chairman's Address, Section on Public Health, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

will prevent us from making further progress, for if we become self-satisfied, we shall immediately begin to mark time. Much remains to be done. We must increase the intensity of our local health service, improve its efficiency, and solve the difficulties of areas to which the present types of local health organization are not readily applicable. In this task there is no single element more important than recognition of the part which the physician may play.

It has been said that the practising physician is the most essential arm of preventive medicine, and experience in public health administration indicates the essential soundness of this statement. We must realize that preventive medicine and the administration of public health programs constitute a specialty of medicine; for the large body of useful knowledge in this field is drawn from the medical sciences. Consequently, in the development of our administrative policies, in our contacts with medical organization and in our relations to individual physicians, we must make our procedure conform to a course that will translate into action the principle that the practising physician is an essential element in public health practice.

There are vast opportunities for integration of the activity of health organizations and practising physicians. Consider for a moment the possibilities in the proper utilization of physicians in tuberculosis control procedure. It will never be possible, nor is it necessary, for us to hospitalize all cases of tuberculosis. A fundamental requirement in that part of control procedure directed to the existing case is that an early diagnosis and early treatment shall be provided. If health departments will establish consultant services which can find cases early and place and keep them under the medical care of practising physicians, not only shall we have conserved the interests of the individual and the public with a very low outlay of capital, but we shall have promoted the interest of the practising physician as well. Any method of public health administration must recognize the principle that public health and medical organization jointly serve the public interest and that the interests of the three groups must be conserved.

We have already demonstrated to the satisfaction of the health organization, the public, and the medical profession of Tennessee, that such a policy is perfectly feasible and entirely constructive when applied to this part of the problem of tuberculosis control. Similar principles may be applied in increasing the immunity status of the population in control of communicable infections for which we have immunizing agents. While it is the obligation and duty of the health officer to obtain an immunity status of sufficient degree to interpose the necessary barriers to the spread of infections, it is perfectly possible for him to utilize the services of physicians as is being done in Detroit and in many Southern areas.

We are also confronted with the development of practices calculated to produce health, for we must not confine ourselves merely to control of the factors which produce disease. We must study the causes of health as well as the causes of disease, and attempt to influence the development of such causes in the community. The periodic health examination is an example of activity in this field and a particularly good example of the part which the physician may play. The health organization may well stimulate and promote the public interest in periodic health examinations, and I venture the prediction that this movement will not attain the success which it deserves until combined resources of health organizations and practising physicians are brought to bear upon the problem. The question immediately at issue is, how may better team play be brought about between health organizations and physicians in order that the physician may be enabled to play the part he is well equipped to play in the practice of preventive medicine and in the promotion of the public health. There can be no question that one of the most important measures in bringing about this team play is concerned with medical education and a thorough understanding by the physician, himself, of the leadership which he may exercise and the contribution which it is within his power to make.

Material progress is being made in the development of this principle in medical education, as is evidenced by the work of the Department of Preventive Medicine in the Vanderbilt University School of Medicine.

Decades, and even generations, must, however, elapse before the full value of this work has been realized. Very much can be done during the interim, and with this phase of the question we are now concerned. Personal contact and interchange of ideas promote understanding; mutual understanding promotes unity of action. I believe that we have in the Section on Public Health of the Southern Medical Association an

instrument which we can make very potent in the promotion of understanding and in the integration of the activity of public health workers and practising physicians. It has long been recognized that the Public Health Section of this Association contains one of the strongest groups of public health workers in the Country. Within its membership are the leaders, as well as the rank and file, of Southern preventive medicine. Why, then, is it not possible for the influence of the Section to extend to other Sections which hold in their memberships the leadership of the practitioners of Southern medicine? Why might it not be possible for this Section to become the common meeting ground and the forum of public health workers, general practitioners, pediatrists and other specialists having either a direct interest or a collateral interest in preventive medicine, and in promotion of the public health? It would seem a very simple matter and would appear to involve relatively minor changes in the functioning of this Section. For example, if a series of programs can be developed in which practising physicians and public health workers have a community of interest, attendance upon our Section meetings by the membership of other sections will naturally occur. This experiment has been in progress in the corresponding section of the American Medical Association for the past two years and there is every indication of a successful outcome. We have dealt too much with the science of public health administration and too little with the science of preventive medicine in the programs of this Section. There are other organizations and other groups in which we can develop our ideas on administrative practice and in which it is not possible to meet the groups having a direct collateral interest in our work.

Another relatively simple measure would be the adaptation of the time of section meetings to a schedule that would make possible attendance by representatives of other sections without sacrifice of attendance upon their own sections. Perhaps the Section on Medicine and the Section on Pediatrics have the strongest collateral interests.

The third method of approach would be in the arrangement each year of one or more joint sessions, and the development of a program for the joint session which would have a very direct interest for the members of each section.

The real leadership of Southern medicine will be found in the Southern Medical Association. If, therefore, the Association can serve to some extent to lead in the promotion of unity of action between public health workers and practitioners of medicine, the effect upon state associations and the resultant effect even in individual communities can be readily understood. Why can we not in this Association, which is second only in importance to the American Medical Association, set the pace in cooperative endeavor between physicians and public health workers which the South has established in the development of its public health practice and in the standard of its medical practice?

PUBLIC HEALTH AND MEDICINE IN FLORIDA*

By C. F. Roche, M.D.,
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Certain factors of importance, peculiar to this latitude, for the prolongation of human life and the restoration of health, have challenged the attention of medical men in other sections of the Country to the extent that there exists a desire on their part for a modicum of information having a bearing on the welfare of patients whom they may direct Southward during the colder months of the year. It is with this thought in mind that the writer will attempt to convey such general information and statistical data as may be of interest.

Due to the untiring efforts of the leaders in organized medicine, notable among whom was the late and distinguished Dr. James M. Jackson, the standards obtainable for the right to practise medicine and surgery in the State of Florida have come to be accepted as comparable with those of any state in the Union.

Born from a sincere desire to abolish laxities that may have existed in earlier and more immature years, a non-reciprocal policy was inaugurated some years ago which it is believed has been of importance in elevating the professional aspect of the State as a whole; and concomitantly it has aided in establishing a much desired increase in the confidence and respect of our colleagues in established and prominent extra-state centers.

Following closely these efforts and with the same dominant purpose of building well, a bill

*Clinic, General Clinical Session, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

was prepared and presented providing for the annual registration of persons holding Florida licenses to practise the healing arts. This bill became a State law on May 28, 1927. As a result of its enactment, during the calendar year of 1928 a total of 1430 doctors of medicine holding Florida licenses to practise registered with the State Board of Health and received a certificate of registration. For the first time in the history of the State, a central record has been provided containing authentic information as to the number and whereabouts of individuals practising the healing arts in this State.[1]

STATE HEALTH ADMINISTRATION

This most important function was outlined by Dr. B. L. Arms during his administration of the office of state health officer in a paper which appeared in the August, 1926, issue of the *Florida State Medical Journal*. The following paragraphs under the subtitle, "State Health Administration," are from his pen:

"The State Board of Health consists of 'three discreet citizens of the State' who are appointed by the Governor and confirmed by the Senate. The law directs that at the first meeting they shall elect one of their number president, and at the same meeting they shall designate and employ a physician, . . . which said physician shall be known as the State Health Officer. The State Health Officer is made Executive Officer and Secretary of the Board."

Five bureaus and administrations function under the direction of the Executive Officer. A brief description of the scope of the activities of the bureau is of interest. The bureau of laboratories was the first separate division and now consists of the central laboratory at Jacksonville, with branch laboratories at Tampa, Pensacola, Miami and Tallahassee. The laboratories examine specimens to assist in the diagnosis and control of any disease or condition of a bacteriological, serological or parasitic nature dangerous to the public health. The laboratories send containers for the various examinations, on request, and any physician can secure this free service at any time. The central laboratory at Jacksonville is also the main distributing point for the biologicals furnished by the State Board of Health, consisting of diphtheria antitoxin for therapeutic use, toxin-antitoxin, Schick test material, tetanus antitoxin for both prophylactic and therapeutic use, vaccine virus, typhoid vaccine and anti-meningococcus serum. These are furnished free to all. In addition to the above, anti-rabic treatments are furnished from the Jacksonville laboratory at cost and, if necessary, free.

The bureau of vital statistics began its work by collecting certificates of deaths and births, but not until 1919 had it sufficient and complete reports to entitle Florida to a place in the Registration Area for deaths, and in 1924 the State was included in the Registration Area for births.

The orthopedic department cares for indigent crippled children to the extent of its appropriation.

The bureau of communicable diseases investigates outbreaks of disease and reported outbreaks, conducts campaigns of immunization, assists communities to prevent disease, assists in the formation of health units, assists in the examination of school children, conducts or assists in the health educational campaigns in communities, and so forth. This bureau, in cooperation with the United States Public Health Service, also directs the venereal disease control for the State.

The bureau of sanitary engineering has the supervision of water supplies and sewage disposal, general sanitation, inspection and certification of tourists' camp sites with periodic inspection to see that the rules of the State Board of Health governing the conduct of tourists' camps are observed, investigation of nuisances, investigation of mosquito-breeding areas, examination of water, certification of water for common carriers, examination and certification of water bottling plants, approval of plans for water supplies, sewer systems and swimming pools, supervision of the sanitation of shellfish areas and packing houses, sanitation of dairies, markets, schools, jails and other public buildings.

The bureau of child hygiene and public health nursing reaches the rural homes and the schools, and the nurses are doing a great deal by conducting pre-school and infant conferences to assist the mothers that the next generation may not show as great a percentage of defects as was found at the time of our entrance into the World War. Neighborhood institutes are held and prospective mothers are shown how they can prepare for the advent by using what they have at hand with very few and inexpensive additions. The pupils at the one- and two-teacher schools are inspected, and pupils who show defects are advised to go to their family physician; hookworm campaigns are conducted in cooperation with the local people. The mid-

wives are seen periodically and a course of instruction is given and examination required. Since this plan was adopted the number has been reduced 41 per cent. After they pass the examination a certificate is granted which must be renewed annually, following another examination; it is recallable at any time for cause. The great influx of tourists and the large number of people living in the camps made necessary the innovation of having nurses whose sole duty it was to visit these camps to aid the mothers and children who were living under new conditions. This pioneer work has been valuable to the State and has been of great assistance to many of our visitors and prospective citizens.[2]

STATE VITAL STATISTICS

The Federal Census to be recorded in 1930 will probably credit the State with approximately 1,500,000 inhabitants, indicating an increase of about 55 per cent during the past decade. The natural increase of population from comparative data is as follows:

Birth rate for 1920, 19,540; death rate for the same year, 12,674, or an increase of births over deaths of 6,866. For the year 1928, the birth rate was 29,776 and the death rate 18,932, an increase of 10,844. The latter figure is in excess of the natural increase in 1920 by 3978. Deaths under one year for 1920, occurring in white children only, were 76 per 1000, which has been reduced in the year 1928 to 54 per 1000, an achievement clearly indicative of the special attention given to this highly important phase of state health. It is fitting to note that this splendid record of Florida's progress is comparable to the best rate recently published by the United States Bureau of Census, which was 46.9 for the State of Oregon.

To just what extent the State's mortality statistics are enhanced by the annual seasonal migration to Florida's warmer climate cannot be precisely stated at this moment, as all deaths are charged to the actual place of death, regardless of the abode of the deceased, but it is fair to state that it is not an inconsiderable number, particularly insofar as such causative factors as the degenerative and natural involutionary processes of middle and old age are concerned. For comparative purposes it may be stated that the death rate for 1927 in Florida per thousand population was 12.5. The latest figures available from the United States Bureau of the Census are for the calendar year 1926, wherein a death rate of 12.2 per thousand population was recorded in the United States Registration Area for that year, representing 89.8 per cent of the estimated population of the entire United States.

The mortality rate per 100,000 for all forms of tuberculosis for the years 1917 to 1927, inclusive, has shown a decline of 43.1 per cent; by races for the same period a decrease of 34 per cent is recorded in the white rate and 46.8 per cent decline in the colored rate. These splendid results are directly attributed to the efficiency of the various anti-tuberculosis organizations functioning throughout the State and the increasingly good results obtained by the effects of heliotherapy on bone and joint and other extra-pulmonic forms of tuberculosis.

It has been extremely gratifying and of considerable interest to note the response to health education in the matter of immunization against communicable diseases. In a period of twelve months the State Biological Laboratory distributed 35,947 vaccine virus capillaries, 63,832 typhoid vaccines and material for 56,801 Schick tests. Considering that the population of the State is greatly augmented during the winter season with visitors from every state in the Union, it is noteworthy to observe that there were but 128 typhoid cases reported for the year 1928. Combined with immunization is the fact that practically all of the municipal water supplied in the State is derived from underground sources at a depth of from 100 to 1000 feet, most of these being in excess of 500 feet below the surface. In many instances they are further safeguarded by chlorination.

There is a total of about 220 certified dairies in the United States and Canada, and Florida has nine of these dairies. In the City of Miami there are four certified dairies, a larger number per capita than in any other city in the United States. In addition to this, 75 per cent of all raw milk is pasteurized.

HOSPITALS AND SANITATION

The Florida Hospital Association, in its last census report, credits the State with 85 registered, privately and municipally owned hospitals, including the several institutions operated by the State. This provides a total of 7944 hospital beds and 512 bassinets. There are eleven hospitals not admitted to the register, with a capacity of 272 beds and 20 bassinets. Many of these are recognized by and operated according

to the standards required by the American College of Hospitals. Facilities for the conduct of the modern practice of medicine, surgery, roentgenology, radiology and physiotherapy are available and strategically located throughout the State. Increasing recognition of these excellent hospital facilities by our yearly visitors has engendered a sense of security that they and their families and friends may be efficiently cared for in any and all emergencies.

HELIOTHERAPY

The average annual temperature for the State of Florida is 70°. Locally, we record the average annual temperature as 75°; the number of days per year with sunshine is 359,[3] approximately 3000 hours of sunshine annually, far in excess of that of the famous sun resorts at high altitudes in Switzerland. The beneficial effects to be obtained from the proven increase in the ultra-violet rays from the sun in this latitude, the daily accessibility of salt water bathing, living continuously in fresh air, you are familiar with. It is well to remember that it is not the heat but the light of the sun that heals. Excessive heat is enervating. Tuberculous patients, especially those with the pneumonic form of tuberculosis, should be cautioned against prolonged exposure in the midday sun. In general, advise your patients to take sun baths with caution, especially the aged and very young. The first sun bath should not exceed five minutes in duration, the time of exposure being very gradually lengthened as pigmentation develops. Early morning and late afternoon, avoiding the midday, are the best hours. The eyes and head should be protected. Fever, extreme fatigue following exposure and sleeplessness are contraindications to further sun bathing.

Experience has shown that such conditions as the various forms of arthritis, neuritis, bone, joint and skin tuberculosis, the anemias, rickets, chronic cutaneous manifestations, particularly extensive psoriasis, all show marked improvement following repeated daily exposures. Cases of chronic vascular hypertension have been noted to show consistent reduction of pressure. Cardiovascular patients, not excepting those with histories of previous vascular accidents or of congestive failure, improve markedly and have been known in some instances to have comparatively good health for years beyond that ordinarily allotted to them. Lessened incidence of ordinary infection, conservation of remaining resistance and the infrequency of pulmonary complications which frequently terminate this type, all play important roles. Patients[4] who are much debilitated and those affected with arteriosclerosis, heart disease or angina pectoris do better in a moderately warm climate. If such patients live in a region where the winters are severe they remain indoors too much because of the cold. A climate which encourages outdoor life is preferable.

GENERAL OBSERVATIONS

The surgeon in Florida has one less postoperative hazard than his colleague in the North in that ether pneumonia is relatively rare in this State. Some hospital records are entirely free from this complication.

The pediatrician deals with a lessened virulence in all of the acute infectious diseases of childhood and, as would be expected, with fewer of the usual complications of such conditions.

The internist and urologist have at their disposal, when necessary for the purpose of alkalinization, an abundance of citrus fruits which are, as a rule, more satisfactory to the patient than the customary drugs used for that purpose. Nor does the clinician have to concern himself with the incidence of goiter or rheumatic heart disease, neither of which is endemic in the State.

Children sent from the North can be assured of clean milk and pure water. Their food and clothing requirements will be, in general, as they are in the summer time in the North. A diet of too high a caloric value is not desirable.

In making the climatic adjustments, an abundance of fluid is wise. Heating foods should be confined to the midday meal and fruits and vegetables liberally partaken of. Clothing should be light in weight and color. Because of the constancy of temperature, maximum ventilation should be the rule in all sleeping quarters. Diversions in many and various forms are at the disposal of those seeking them and should be indulged in until the period of rejuvenation is at an end.

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FURTHER NOTES ON PRESENT-DAY MEDICAL EDUCATION*

By WILLARD C. RAPPLEYE, M.D.,†
New Haven, Conn.

Two years ago I had the opportunity of talking to this Section at your meeting in Memphis, and it is a privilege for me to be permitted to speak to you again this year.

Current problems in medical education can be fully appreciated only in the light of the kaleidoscopic changes that have occurred in medical education in this Country in a relatively few years. These changes have been so rapid that they have amazed outside observers who have had occasion to know the situation during the last twenty-five years.

Everyone is more or less familiar with the chaotic conditions in medical training in this Country at the beginning of the present Century. The medical profession and a few universities had endeavored to meet the needs for physicians in a rapidly developing and sparsely settled country. The apprenticeship type of training was followed by that of the proprietary medical schools which in numerous instances became thoroughly commercialized and hopelessly inadequate, with the result that many of the so-called medical schools were of very low standing. This situation reached its peak during the period from 1900 to 1910. In 1904, for example, there were 162 medical schools in the United States, representing one-half of the then world's supply.

Reacting to this unwholesome situation, the Council on Medical Education of the American Medical Association was organized in 1907. The "Report on Medical Education in the United States and Canada," by Abraham Flexner, appeared in 1910. Following the lead of the American Medical Association, many of the states reorganized their requirements for medical practice or for the first time initiated requirements based largely upon the standard set by the American Medical Association. It was necessary in the circumstances that many of these requirements of both the American Medical Association and of the individual states should be clearly defined and detailed if they were to be enforced.

As a result of these activities, the number of medical schools has been reduced from 162 to about 80, 76 of which are on the present approved list, although only 66 are four-year schools. The student body was reduced from approximately twenty-eight thousand students in 1904 to about thirteen thousand in 1919. Since then the numbers have been increasing steadily until they are now twenty-one thousand. The number of graduates has, of course, followed the student enrollment, dropping from five thousand seven hundred in 1904 to about two thousand five hundred in 1922. This year there were four thousand four hundred forty-six. There are indications that the number of graduates will increase further, possibly reaching about five thousand within a few years.

In this process of elevating standards it was inevitable that the curriculum should become rigid and fixed. During the last twenty-five years there has been an enormous development in the medical sciences, in the main body of medical knowledge, in technical procedures and in the various clinical specialties. The states acting more or less independently have been adding course requirements and examinations in these various fields with the inevitable result that the medical schools, in order to meet the requirements of even the leading states, have been compelled to give courses in many of these subjects. This has led necessarily to great overcrowding and confusion in the curriculum of the individual schools. The situation has become almost absurd in certain instances. A graduate of the Johns Hopkins Medical School and Hospital cannot, under ordinary circumstances, get a license to practise in the State of Pennsylvania today, because in the usual training at Baltimore he would not have received a type of interneship that is required by the Board of Licensure in Pennsylvania.

It was because of the great rigidity and overcrowding of the medical curriculum and because of the number of bodies attempting to regulate medical education, which in recent years has been coming more and more under the control of the universities, that the Association of American Medical Colleges organized a Commission to study the larger relationships of medical training and licensure. This Commission organized as an independent body and representative of the universities, the medical sciences, clinical teaching

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†Director of Study, Commission on Medical Education.

and medical licensure, has been interested not so much in making recommendations for modifications in the curriculum as it has been in modifying the point of view regarding medical education, in an endeavor to place medical training upon a more sound educational basis and to relate it more closely to other phases of university education.

The first action of the Commission was to arrange with the state licensing bodies for a truce of five years during which any medical school might experiment with medical education without penalty to its students. It was the hope of the Commission that during the five year period, a more permanent arrangement would be inaugurated which would allow greater freedom on the part of the universities to conduct medical education as they thought it should be conducted. As a matter of fact, at the last meeting of the Federation of State Medical Boards a resolution was adopted by that organization which aimed to place, as far as possible, all matters dealing with details of the medical curriculum in the hands of the medical schools as represented by the Association of American Medical Colleges. This important and wise action on the part of the Federation will open an opportunity to introduce flexibility in medical training and to place even greater responsibilities upon the universities for conducting that phase of professional training. In the meantime, a number of medical schools, acting under the truce established four years ago, have been conducting experiments in medical training and already a certain body of experimental data is available.

It was the feeling of the Commission that, inasmuch as more than 90 per cent of medical students ultimately go into medical practice of one or another type, it would be highly important to get as clear a picture as possible of the demands made upon practitioners, the various needs for health services in the community, the demands placed upon specialists, and other data of this kind. One of the first things we did was to make an analysis of the work done by practitioners, both general practitioners and specialists. We brought together a good deal of material from various sources which gave a reasonably clear picture of the health needs and demands of the community. This was supplemented by opinions from state licensing bodies, medical educators and practitioners. More recently we have been making a study of medical education in Europe, particularly studying the evolution of the methods and the various devices with which Europeans have been endeavoring to meet their own problems.

Without going too much into detail, several generalizations about medical training can be made. As mentioned above, medical education in this Country was largely separated from other forms of education until quite recently. It is becoming increasingly clear that medical education is not an isolated problem of professional training, but is closely related to the whole problem of higher education. Methods of training found useful in other forms of education are being adapted to the particular problems of medical education. Medical training today is being based upon previous education in a college or university and is being pitched to the intellectual ability and maturity of the student. We are now much less interested in course requirements and credit hours than we are in the knowledge and achievement which the student has at the time he begins and ends his training.

If medical education is to be looked upon as a part of higher education rather than as merely a vocational training, it will be necessary for us to revise to some extent the general objectives to be sought. All true education is self-education. One important purpose of medical training is to equip the student for his own self-education throughout the rest of his professional life. We should be interested in developing in the student not only sound methods of self-education, but sound habits as well. We already see indications in many medical schools of this new point of view as witnessed by the breaking down of the rigid class system, the discontinuance of uniform time and course schedules, the use of small teaching sections in the medical sciences no less than in the clinic, personal contacts between students and instructors in the laboratories and the wards, provision for a reasonable amount of free time for reading and leisure, the reduction in the amount of lecturing, the use of electives and the beginning development of the use of comprehensive instead of departmental or subject examinations.

As a corollary of self-education, a sound medical training should aim to develop in the student a certain amount of resourcefulness and self-reliance which will permit him to develop independent thinking and to get away from the rule of thumb secondary school type of teaching characterized by memory work and spoon-feeding of details. There are many who believe

that in some cases our medical training actually damages the intellectual development of the individual. Certainly we do a good deal to unfit the student psychologically to do independent practice and there can be little doubt that the faulty distribution of practitioners is further accentuated by recent trends in medical training which have tended to make the average student too dependent upon laboratories, consultants, specialists and various ancillary services for the recognition and handling of relatively simple problems.

Another trend in medical training is that toward making the medical course more of a unit. It is evidently an endeavor to correct an overemphasis upon subdivisions of the medical sciences and clinical medicine. Everyone recognizes that it is impossible for a student to master all phases of current medical knowledge. It is particularly true that an endeavor has been made to teach too many details too early. Reacting to this situation, a number of schools provide that the basic courses shall be for the purpose of introduction to the subject and orientation in it. It is an endeavor to correct the water-tight compartment type of instruction which has been in vogue in recent years.

Only a few brief comments need be made at this time on the pre-medical requirements. We prescribe the course credits required for admission to medicine without concerning ourselves very much with the knowledge the student may have of these subjects. In fact, many of the pre-medical subjects are sub-divided into specialties, the content of which provides relatively little preparation for the study of medical subjects. It has been suggested recently that instead of accepting course credits for admission to medicine, examinations be given on the so-called pre-medical sciences.

A second point of interest in the pre-medical subjects is their motivation. Most of the courses in the preliminary sciences are given by specialists who emphasize their own particular interests and details of instruction rather than general principles which, after all, are the important things for the student to get. Physics in many university courses is presented as mechanics, hydraulics and other topics of particular interest to engineering students. The courses in chemistry frequently deal largely with the metals and with gravimetric rather than volumetric methods. Courses in biology are frequently in fields of botany or animal classification which do not aim particularly to drill the students in fundamental principles. There seems to be little doubt that a reorganization of the teaching in the preliminary sciences could very easily provide the students with a better comprehension of the principles of these subjects in a shorter time than is now devoted to them.

Efforts are being made in some of the universities to introduce features of self-education, but we are still laboring under the difficulties of mass education, which need not be dealt with in detail here. The size of the problem is suggested by the fact that enrollment in the colleges and universities has increased eight times as rapidly as the population during the last thirty-five years (the increase in the numbers in secondary schools has been twelve times as rapid as the population). There are now three times as many students in the institutions of higher education as there were in the secondary schools in 1890, since which date the population has about doubled. It is quite evident that the basic general education is coming to be at least a partial college education for all higher training (medicine, dentistry, law, business, and so forth). It is exemplified in the fact that this year 66 per cent of medical school graduates have also a baccalaureate degree (corresponding with 15 per cent in 1910 and about 5 per cent in 1905).

The pressure of the student body in colleges is reflected in part by the increasing numbers of applicants for admission to medical schools. A few figures illustrate the situation and suggest some of the difficulties of selecting students:

	1926-27	1927-28	1928-29	1929-30
No. of applications	20,093	23,590	29,166	31,481
No. of applicants	8,500	11,282	12,537	13,569
Applicants accepted	6,420	6,495	7,014	7,019
Applicants enrolled	.....	6,009	6,199	6,277

Multiple applications are the rule: some students apply to thirty or more schools, several each year apply to as many as forty. Several hundred students were accepted in more than one school (some by five or more). The difficulty of selecting students has a tendency to force admission committees to pick students with the longest college records who have done more than the minimal amount of required work in the specific pre-medical subjects. A certain number of promising students who defer their decision to study medicine until their final year in college are unable to do so because of the fact that they have sought a liberal education, and if so cannot ordinarily satisfy the pre-

scribed entrance requirements. There is little doubt that time spent in the required premedical subjects above an optimal amount curtails time spent later in post-graduate preparation which is likely to be more valuable. That many students can secure admission by persistence in applications and by prolonging their preliminary education is indicated by the fact that about one-half the students refused in a given year apply again the following, second and third years, and approximately 50 per cent of them are ultimately admitted. These and other factors are operating to force another method of selecting students than by courses and length of preliminary education.

In the "logical plan" of medical training (as distinguished from the "natural" method of the French) the first part of the medical course deals with normal structure and function which should lay not only a foundation but provide the scaffolding of subsequent instruction. Students familiar with the normal and the deviations which may occur within normal limits should have the essential elements to grasp the significance of pathological changes and hence of clinical medicine.

An examination of the usual courses given in the immediate past shows certain defects which are in the process of correction and certain new features which promise to strengthen the instruction in the medical sciences. There has been great over-crowding, the students have been obliged to memorize too many details too early, often long before they have become oriented in the subject. The different departments frequently have been isolated and have conducted instruction in their field without regard to the work of other departments carrying instruction simultaneously or subsequently. Some of these difficulties can be corrected by proper faculty cooperation and by making the courses introductory in character, the details to be filled in later; by allowing some freedom for reading and thinking; by parallelling instruction between departments when possible; by what the British call "infiltration," both upward and downward, in which the whole medical training becomes a unity, not a series of isolated subjects; by the presentation of clinical cases as abnormalities of structure and function to assist in the teaching of anatomy and physiology (not the same thing as clinical demonstrations!); by teaching anatomy and physiology on living human beings rather than relying too much on animal experimental work, for example (surface markings, x-ray of gastro-intestinal tract, joints, chest, respiration experiments); and by using the laboratory as a means of illustrating and illuminating subjects and methods rather than by placing too great an emphasis upon it as an instrument of education.

In teaching clinical subjects, the same emphasis upon self-education, resourcefulness and the introductory character of the subjects should apply. Clinical medicine is in fact a logical continuation and elaboration of the medical sciences to include clinical pathology, post-mortem study, physical diagnosis, history taking and the use of special instruments of examination. This preliminary clinical period, transitional from the normal to the abnormal, is the most important period for the student and should have the special attention of the senior, not the junior, members of the faculty.

The basic course of clinical instruction should be general in character and comprise the subjects of medicine (including pediatrics and psychiatry), the principles of general surgery and obstetrics. There is a growing opinion that advanced training in these major subjects and the preparation for special practice should be postponed to post-graduate work. There has been a considerable amount of confusion in the teaching of the clinical subjects because of the demands of the various specialties, often supported by state board requirements, and the advanced teaching in technical methods in medicine and surgery. The sub-division in clinical teaching has evidently been overdone and many schools are now simplifying their plans of instruction. The correlation of the medical sciences on the one hand and of various clinical subjects on the other has been engaging attention recently and various devices from "spoon-fed correlation," joint clinics and clinico-pathological conferences to comprehensive examinations are in use. The last named is proving to be particularly effective in stimulating students to correlate otherwise isolated information to bear on a particular problem.

The preventive aspects of medical service are coming in for increasing emphasis. The fact that the maternal mortality in the United States is higher than in any other civilized country and that this high rate is largely attributable to infections (40 per cent) and toxemias (27 per cent), which are largely preventable, illustrates how important the subject is. The prevalence of many preventable diseases and of much pre-

ventable incapacity and lowered productivity is a direct challenge to medical practice and teaching. Efforts are being made in a few medical schools to emphasize the features of periodic medical examinations, as an illustration, and most schools give some attention to the care of normal children, most of them cover the field of prevention in obstetrics. Only recently, however, has there been any attempt at all to mobilize the whole curriculum to present the preventive aspect of each subject, an aspect which can be made very important in such subjects as physiology, for example.

The importance of therapeutics is being reemphasized. The help in treatment to be secured by rest, proper diet, mental hygiene, exercise, sunshine and other physical agencies has not been properly stressed in much of the teaching which has for a time been concerned largely with specialized laboratory diagnosis and technical procedures. A type of "physiological thinking" is coming into therapeutic procedures.

Our studies of practice have shown that only about 10 per cent of visits by physicians in general work are in hospitals and the balance are in the office and home. An increasing importance is being assigned to out-patient teaching in preparation for practice. Here are seen the beginnings of disease, great numbers of minor complaints and the usual run of functional disorders, all of which bulk so large in the medical needs of the community. The greatest value of the out-patient teaching is secured where senior, not junior, members of the faculty conduct the teaching there.

The intern period, now regarded as an integral part of the basic training, is probably the most important period of that training and represents at the moment one of the most defective parts of it. The internship is used too frequently for the purposes of the hospital or staff, without due regard for the educational experience for which it is primarily designed. The student is taught to depend too much upon specialists, consultants, nurses, laboratory workers, x-ray departments, dietitians and the other personnel of the hospital staff for the best interest of his own training. The many services provided for the diagnosis and care of hospitalized patients, for investigative work, hospital records and teaching material are all very important for their several purposes, but the intern should not be taught that all these are necessary for the care of every patient. There is a strong opinion that much is done in the hospital period to make the student unwilling or unable to practise medicine in communities where all or most of these special services which he has come to regard as necessary for practice are not available. The large opportunities of the out-patient service for training of the intern are too often badly neglected.

The present trend in medical licensure, as suggested earlier, is toward placing greater responsibility upon the medical schools for working out the details of the curriculum and less prescription of those details by state boards. The state boards are moving in the direction of merely approving medical schools. They also are moving away from detailed examinations on facts and some states are already making their licensing examinations essentially comprehensive in character. The function of a state medical board is to satisfy itself that a candidate is competent to begin the practice of medicine, a responsibility now recognized as primarily educational, and the various boards are now paying more attention to other duties, particularly in the field of enforcement of the medical practice acts. The licensing of specialists may become a new responsibility for the state boards as a part of the problem of post-graduate education.

Post-graduate medical education is receiving an increasing amount of attention and promises in the near future to be one of the large problems with which the medical profession must deal. It is a question not only involving education, but has many implications of a sociological and economic character, involving the continuous education of all physicians up to 65 years of age. It is possible that in time every physician practising medicine will be required in the public interest to keep abreast of current development in medicine by participating in some form of continuous education.

The problem of post-graduate medical education divides itself into several major parts. One deals with the training for the specialties. It is quite likely that in the near future every specialist will be obliged to take an adequate train-

ing to qualify him for his limited field of practice. Whether or not he will have a special license is not as important as to provide some device by which the public can be assured that a given surgeon, for example, is in fact competent by training and experience to perform the surgery which he proposes. A beginning in this direction has already been made by many hospitals and some of the National associations of specialists. It has been hoped that this phase of the question may ultimately be handled satisfactorily by the hospitals. At any rate, the medical profession in its organized capacity will sooner or later have to take up this question. The profession of Denmark has already done so and has worked out an interesting scheme of dealing with the problem. Another group to be considered in this problem is the general practitioners for whom different types of courses and continuous training have been worked out. In a number of states the medical profession, either independently or in conjunction with universities, have worked out medical extension instruction, the details of which are beyond the scope of the present discussion.

I have referred to the matter of post-graduate training particularly to emphasize the relationship of the basic course in medicine to it. Any form of continuous or adult education is essentially self-education which is becoming more clearly recognized in medical training. The basic course should aim to provide sound methods and habits of study and to give the student a permanent intellectual equipment which will permit him to carry on subsequent self-education more or less independently. By limiting the objective of the basic course to a more or less comprehensive treatment of the principles underlying various sub-divisions of medical practice, the physician should, on the basis of that broad foundation, be more competent and reliable in subsequent specialization.

There are many other topics dealing with the cost of medical education, the selection of teachers and various details touching on methods of instruction which might be discussed if time permitted. Before closing may I comment on one other general topic with which medical education is concerned.

Probably the largest problem before American medicine today is the adequate distribution of sound health services to the entire population at a reasonable cost. It is well recognized that a very considerable gap exists between our present knowledge of the diagnosis, treatment and prevention of disease and its application to the needs of individuals and the community. This whole problem is in reality one of medical economics as well as medical education. Its solution can be approached only by insuring that every physician shall be kept familiar with new knowledge and new methods in the treatment and prevention of disease. This is partly an educational problem. It will be necessary also to mobilize all the medical, nursing, hospital and community agencies in a common program with the attendant problems of organization and finance. There is also the large problem of effectually coordinating the activities of individual physicians practising either as general practitioners or specialists. The whole problem of "referred work" between practitioners and specialists and between one kind of specialist and another, which is one of the important contributing factors to the increasing cost of medical care, is only a part of this question. The production of physicians in excess of the needs of the community and the sub-division of labor, as represented by specialization, beyond actual needs are further details of this problem. That portion of the cost of medical care which arises out of unnecessary medical services, either recommended by physicians or demanded by the public, and represented by unnecessary hospitalization, surgery, laboratory work, x-ray work, consultant services and nursing is another phase of this matter. The solution of some of these problems depends entirely upon trained personnel and scientific knowledge for dealing with not only the 10 or 15 per cent of the population that are ill at any one time, but with the conservation of the health of the entire population and the prevention of disease. The satisfactory solution of these problems requires leadership of the highest order and places large responsibilities upon the medical profession in its organized capacity. These responsibilities should be emphasized in the training of medical students.

THE EDUCATION OF THE GRADUATE*

By J. H. MUSSER, M.D.,
New Orleans, La.

In this Section we have discussed the many and intricate phases of medical education; we have delved into the problems of instruction of the medical student; we have descanted upon the exoteric questions of the minute; we have all of us learned from the experiences of others recited at this annual meeting, and we have been instructed, informed, edified and even sermonized as to how best to conduct the training of the young man studying medicine. Yet all of our pedagogic discussions of the past few years have been limited to the problems of the pregraduate student. The Section has been broad in its selection of speakers, catholic in its choice of subjects discussed and conspicuous in its enunciation of principles and fundamental truths concerning the why and wherefore, the how and when of teaching the undergraduate medical student, but never have we taken into consideration the instruction of the doctor of medicine who has completed his medical course. Whether or not this is a subject which should be brought before this Section, I do not know. Perhaps we are limited by the Council of the Southern Medical Association to a program of undergraduate education. Again I repeat, I do not know. Be that as it may, I doubt that any criticism of the Section would be made were we to enlarge our point of view and to take up the question of how best to aid the general practitioner in keeping abreast of current medical knowledge.

The reason I propose to discuss this theme rather briefly is that last summer I had the opportunity of conducting a so-called extension course in medicine in a rural community in one of the Mid-Western states. So enthusiastic was the average man over this method of post-graduate instruction, and so definitely did he appreciate its advantages that I have become an active proponent of the general scheme of giving post-graduate instruction to the practitioner, not by the customary methods of having him divorce himself from his practice for a period of weeks or months with a consequent economic upheaval which he is generally unwilling to undergo, but by the simple plan of bringing the teacher to the student, in this case to the practitioner of medicine. Under this scheme the medical man need not disrupt his practice, give up his income and absent himself from his home and family in order to increase his knowledge, to broaden his outlook, and to become a more competent practitioner of his profession.

The plan of extension post-graduate courses is by no means new. It was first started in North Carolina some years ago, and at the present time the states of Wisconsin, Oklahoma and Kansas, through their state universities, are offering such courses to practitioners in their communities. In addition to the state university courses, there are also one or two extension courses offered by universities not strictly state institutions. Several years ago a somewhat similar scheme, of using foreign medical instructors, was advocated at the Southern Medical Association meeting.

It would seem that extension courses would be of tremendous value to Southern practitioners, many of whom are working in smaller towns, who have not had the opportunity of following present-day medicine and to whom a review course in such general subjects as medicine, surgery, pediatrics and obstetrics would be of tremendous value.

Succinctly, the course of instruction might be carried out in this manner: the course would be held in one of the smaller cities of the South; it would be given for two hours each day for a week or for two hours one day a week for some six to nine weeks, in which case the teacher would visit four or five other cities during the week. The physicians in the community where the course would be held would be assessed a sum sufficient to pay the expenses necessarily arising in the conduction of the course. As a concrete example, in my work last summer one hundred and seventy-odd physicians were registered for the course. These paid $35.00 for a series of nine lectures and clinics lasting from two to three hours, one day a week. The income from these fees was something over $6,000, yielding a substantial profit to the University Extension Course, under whose auspices it was given. It would be possible to conduct courses at less expense, but if the relatively small fee which amounts to about four dollars a lecture were maintained, from the income enough money would be obtained to pay for an instructor or teacher of recognized reputation and sufficiently

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*From the Department of Medicine, Tulane University Medical School.

distinguished in the world of medicine as a teacher and educator or a clinician to guarantee his efficiency. A certain amount of organization work, practically all of which can be conducted from the central office, is necessary to establish the classes. The moneys that would come in as a result of the fees collected from the men taking the course would pay for extra office expenses, including a secretary in charge of that particular phase of the work.

I have outlined very briefly, indeed, a plan which might well prove to be workable, practicable and beneficial for the post-graduate instruction of the general practitioner, who in the great majority of instances is eager and desirous to increase his fund of information. It would seem to me that the details of such a scheme would have to be worked out by a committee who in turn would present the whole matter to the Council of our Association for their action. I leave to you the suggestion that such a committee be appointed to consider the matter further in order to decide upon its feasibility and to determine whether or not it would be advisable to make a report to the Council, praying for action upon this matter.

THE ACUTE HEART*

By KENNETH PHILLIPS, M.D.,
Miami, Fla.

Each time that I pick up the little masterpiece written by Cope, "The Acute Abdomen," I wonder why some world famous cardiologist has not given us a similar compend with the caption "The Acute Chest." In my opinion, acute lesions within the chest cavity are today producing more confusion and more errors in diagnosis than any other equally common group of lesions in medicine. The literature is sadly lacking in its presentation of a definite and concrete mental picture with which every practitioner can equip himself to take with him to the bedside; for after all it is to the bedside that we are called to diagnose and render at least emergency treatment to this group of patients.

I entitled my paper "The Acute Heart" in order to give me leeway to choose what I consider the most valuable and important major points in the diagnosis and at the same time to allow me to use sufficient special and laboratory findings to prove my diagnosis. The most valuable and important feature in the diagnosis of the acute heart lesions is the obtaining of a reliable and complete history. I now present three cases which will bear out my opinion. Although each case has been worked out thoroughly in regard to history, physical, and laboratory findings, in order to conserve time and space I shall present only the physical and laboratory findings that are necessary to substantiate the histories.

Case I.—The first case is that of a man 45 years of age, in good health, whose past history was essentially negative except for removal of an infected gall bladder eight months before the attack to be described.

He had been out for several hours, playing 36 holes of golf, came home quite fatigued, sat down on the bed to take off his shoes, when out of a clear sky, he was seized with a sudden extremely severe pain in the precordia, which radiated into both sides of the neck and down the left arm into the fourth and fifth fingers. He described a sensation of hot fumes upon each inspiration, and refusing to move even far enough to lie down upon the bed on which he was sitting, he was found four hours later in a half sitting posture leaning to the left, clutching at his precordia, cold and clammy, ashy in color, drenched in cold perspiration; pulse rapid and hardly perceptible, heart sounds distant and blood pressure down to 90/40 as compared to 130/70, which it had been eight months previously at the time of removal of his gall bladder.

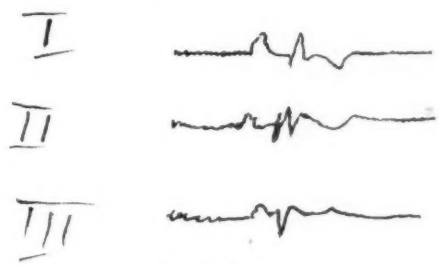

Fig. 1. Case I
Low voltage, all leads. Notching of downstrokes of P deflection and slight left axis deviation. Negative T in all leads.

Case II.—A man 35 years of age complained of a precordial distress which he described as a band-like or gripping sensation always beginning in a spot which we may term a trigger point to the left of the sternum in the third interspace. It radiated to the left shoulder and down the left arm into the palm of the hand. The distress was paroxysmal, coming on very suddenly, lasting only a few seconds to a minute and disappearing as suddenly as it came. During the attack he was forced to stop "dead still" and could not move until the attack was over, at which time he could go along as before. The attacks were brought on by exercise, heavy eating, excessive smoking or gaseous

*Clinic, General Clinical Session, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

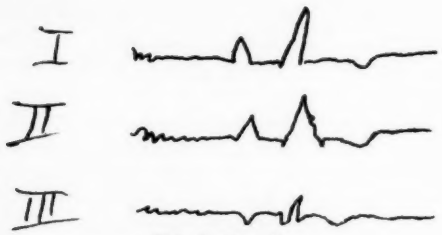

Fig. 2, Case II
Increased height and breadth of P deflection slurring of QRS deflection. Inversion of T in all leads.

distention. The past history was negative except for convulsions during infancy, and his present health was good, except for the above complaint.

Case III.—The third case, I term my prize of medical practice, for I find in reviewing the literature that coronary thrombosis in a patient under fifty years of age is a rarity. A young woman, 33 years of age, was awakened in the middle of the night with a pain which gradually grew worse until it was violent, located rather diffusely over the lower part of the chest near the sternal border and epigastrium, radiating to the left scapula and down the left arm into the tips of the fourth and fifth fingers. Four hours later she was seen writhing in pain all over the bed, cold and clammy, bathed in cold perspiration, pulse rapid and almost imperceptible, wretching at intervals but very little vomiting, with hiccoughs, slight dyspnea and a mild generalized cyanosis, which gave her a dusky color. The upper abdomen was rigid and tender, the blood pressure was 85/45 mm. of mercury; the heart sounds were very distant and feeble. This picture remained for about the next 12 to 18 hours, when she presented signs of dilatation, mild decompensation with some signs of fluid in the abdomen, a leucocytosis of 14,000 and a precordial friction rub at the third left interspace. Her electrocardiogram tells her story.

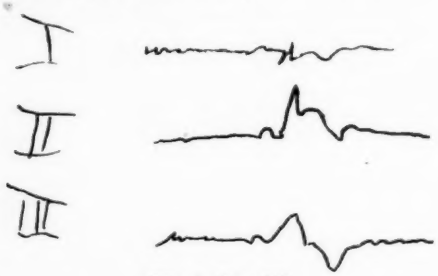

Fig. 3, Case III
Low voltage, all deflections in lead one. Characteristic arching of ST interval with inversion of T wave.

DISCUSSION

These three cases represent three separate and distinct cardiac conditions, each of which can be almost conclusively diagnosed at the bedside from the histories and a few physical findings. Still, all were misdiagnosed at the first sitting, being called in order, diaphragmatic pleurisy, coronary sclerosis and acute perforation or pancreatitis. Let us analyze *Case I.* A man of forty-five is in good health. A badly infected gall bladder was removed eight months previously, and now followlowing strenuous exercise he is stricken with an explosive pain, which radiates characteristically and renders him unable to move even enough to lie down. Four hours later he is still in a half sitting posture, presenting the picture of shock, with a drop of 40 points in blood pressure. With this picture carefully reviewed, could the condition be confused with diaphragmatic pleurisy? Could the case be diagnosed angina pectoris when his picture and history is compared to that of *Case II?* The distress in *Case II* is paroxysmal. It comes and it goes and we do not find this patient sitting, clutching at his precordia four hours after the onset of his attack. He tells us that his attacks never last over one minute and while he is compelled to stop during them, he goes about his business just as soon as the attack is over. He tells us some more interesting history in that the attacks are explosive in onset, always begin in the same spot and always radiate in the same direction, leaving almost as suddenly as they appear. I have given red and blue skin pencils to six of my patients presenting this picture and asked them to trace one attack in red, the other in blue over the trigger point and course of the pain. The red and blue lines were exactly superimposed.

In my opinion, *Case II* presents a true angina pectoris, can be diagnosed by the history alone; and if the attacks do not present this picture, the case is not one of angina pectoris. I have never been able to agree with opinions such as one I read recently, that angina pectoris may be divided into thirty-two types. The condition either is or is not angina pectoris and if it is, this picture will stand out especially with the four cardinal earmarks of the distress, namely: paroxysm, explosive onset beginning always at a trigger point and radiating always in the same direction, the attack rarely lasting over two minutes, during which the patient is compelled to stop "dead still."

There is reasonable excuse for diagnosis of perforation or pancreatitis in the third case, for these, together with acute gall bladder colic, are the most difficult lesions to distinguish from coronary thrombosis. But, again consider the

picture as a whole. Here is a patient awakened from her sleep, as contrasted with the exercise preceding *Cases I and II*. The pain was gradual in its increasing intensity until it became excruciating and four hours later she was found writhing over the bed in agony. Contrast this picture with the position assumed by *Case I* at the same interval following his attack. Both present the color, shock, fall in blood pressure; but 12 to 18 hours later *Case III* has characteristic signs of mild dilatation and decompensation. The friction rub described by Hook, a leucocytosis, and the characteristic tracing are all absent in the first case. They brand the third case as a thrombosis, while the first case in all probability was an embolism.

In conclusion, I return to my original statement that our greatest asset in the diagnosis of acute heart conditions is to teach and equip ourselves with a definite and concrete mental picture, then to obtain a reliable history and to make it fit into our picture frame or question our diagnosis.

THE CHANGING SOUTH: ITS PORTENT*

By L. R. Powell, Jr.,†
Norfolk, Va.

I deem it a great privilege to be with you and to pay tribute to the medical profession for the indispensable part it has played in the progress of the South and of the Nation, and, therefore, in the onward march of business and industry.

Whenever we attempt an appraisal of business and social intercourse we encounter the physician's leadership. In our study of that leadership we discover a rather peculiar phenomenon: I mean his attempt or effort to put himself out of business.

The physician's chance of monetary reward, his opportunity to make a living, is plainly dependent upon the existence of disease or abnormal physical conditions. If everybody were to remain healthy, if all of us were to stay within the circle of physical normality, it is clear that the physician would have to take down his shingle.

Yet the medical profession, including its surgeons, its pathologists and its bacteriologists, is striving as never before in the world's history to discover methods for the prevention of disease. It is not enough that they invent the means to heal the sick, cure the maladies that make inroads into the health and happiness of humankind. It is the glory of the medical minds of our land, and of the world, for that matter, that they seek the sources of weakness, of ill health and of death so that their devastating forces may not be felt or at least may be minimized. This attitude and method on the part of the world of medicine and science is the finest exemplification of the genuine spirit of benevolence and sacrifice. It is the truest type of the central principle of Christianity. This, therefore, is my reason for saying I desire to pay tribute to you as representing a profession which is justly distinguished for its spirit of outstanding unselfishness.

In thinking over what I might say to you on this occasion I found my mind reverting to the thought of what you have meant to industry. Very naturally my mind travels along those lines which relate to industry, to the production of wealth and its distribution, for I am a co-worker in the operation of the one form of industry that may truly be deemed the backbone of the Nation. Whatever may be said for the ramified forms of communication and transportation in America, it is still true that the steam railroads constitute America's industrial and commercial backbone. The railroads are to the Nation as the circulatory system in the human body, which conveys to the uttermost parts of a dependent body the life-giving stream of nourishment and the consequent glow of health and well-being.

There are many factors which enter into successful transportation. There are problems of engineering, of economics, of finance, of law and what not, but let us not forget that medicine has played its part. Speaking of transportation in its entirety, perhaps the most outstanding example of the contribution of medicine to business and industry in recent years relates to the Panama Canal, the story of which is one replete with interest. As you all know, as early as 1550 the Portuguese planned such a canal. From that time on until the United States car-

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*Paper was read by Mr. J. F. Wright, General Solicitor, Seaboard Air Line Railway, Norfolk, for the author.

†President Seaboard Air Line Railway.

ried the work through, the leading nations of Europe spent much effort and money on the project. Concessions were obtained, companies were organized, millions were spent: but all came to naught. The French made the most imposing efforts, but they gave them up as a bad job. The experience of the French companies who tried to build a canal was marked by financial disaster and a terrific toll of human life from the scourges of yellow fever, malaria and the plague.

Then America got on the job: and the initial thing the first Panama Commission did was to look to the vast problem of sanitation. Experiences in building the Panama Railroad and the French attempts to build a canal showed the absolute necessity for effective sanitary measures against yellow fever and malaria.

William C. Gorgas had had much experience with these maladies in Cuba. For his great work Congress, by special act, made him Assistant Surgeon General with the rank of Colonel. So in 1904 he was put in charge of sanitation in Panama. Hospitals were established and quarantine measures were inaugurated, always pursuant to the latest scientific thought of the medical profession. In three years yellow fever was eliminated from the Canal region and this has become one of the healthiest spots in the world. In the construction period the death rate was 663 persons annually against 7800 per year under the French attempts. In ten years under the French it is reckoned that there was a death toll of 78,000 souls. Under Gorgas the death rate became 1.7 per cent, while at the same time in New York City it was 2 per cent; in Philadelphia, 2.1 per cent; in Washington, 2.2 per cent. Surely this is so remarkable as to justly command our profoundest admiration. And it may be definitely said that but for the labors born of medical and sanitary science the Panama Canal would not exist today.

An important department of the American Railway Association is the Medical and Surgical Section. Valuable work has been done by that Section with reference to drinking water, proper sewage disposal and other subjects of very vital importance to railroad operation. It has not stopped with a consideration of narrow questions, but has designed a sanitary code to unify and standardize those regulations, rules and practices so important to transportation.

What does all of this work of the medical profession point to? What does it indicate to those in your field? There is only one answer: it marks you as leaders. It means that you are necessarily in the vanguard of on-rushing humanity. If your training, your mental equipment, your position in the community and your outlook on life have cast upon you a mantle of leadership it is essential that every possible effort shall be exerted to measure up to the requirements of that leadership.

This is a day of exceedingly fast thinking. Men's minds are working incessantly in the effort to keep up with the feverish pace of the world of business. As I see it, what we need to keep constantly in mind is, that quick thinking and quick action are not enough. There must be safe and sane thinking. We cannot afford to lose our bearings in striving to attain the desired goal. And I know of no members of our communities who are better fitted to promote safe and sane thinking than the doctors. Their efforts towards intelligent government and living are capable of directing along various lines: by speaking their convictions on public questions, by advice to their legislative representatives, by direct influence on their communities, and through other avenues commonly and legitimately open to the citizen who must rightfully assume leadership.

I am sure no one here would have the temerity to deny my statement that never before in the history of our Nation was the need of genuine leadership in our Southland so great as at this very moment. There are several outstanding reasons for this. Foremost among them is the fact that the old South is becoming a mere memory. There is in progress what might be termed an unmistakable shifting of the "center of gravity" in industry. I do not mean to say that there is going on a rapid exodus of industries from North to South; but I do mean to say that the outstanding fitness of the South not only for agriculture but also for manufactures is today, more than ever before, realized throughout the nation of business; and the gradual and firm development in the South along industrial lines eloquently testifies to that fact. This transition is taking form under our very eyes and it is supremely important that we not only keep our eyes open but act on the strength of what we see. We must do all in our power to build a sane industrialism permeated with an immovable determination to be fair to every element that contributes to that

industrialism, whether it be labor, capital, the state or the home. Sane legislation, just forms of taxation, equality of opportunity, scientific regulation of public service corporations, and sensible requirements concerning the distribution of commodities must be realized if our new Southland is to be erected on a firm and lasting foundation.

These rapidly changing conditions in our Southland necessarily confront us with new problems, which have to be met immediately as they arise, and as in all cases where action is taken hurriedly, we are prone to overlook some points which should be given consideration. I, as a railroader, am particularly interested in railroad problems. The history of the development and growth of this Country is the history of the railroads. Whatever corner of the United States the railroads have pierced, there have sprung up thriving villages and towns, many of which have since become our principal cities. There have appeared farms and orchards, groves and truck gardens. The railroads led the way and prosperity followed.

Soon came the automobile, which at first was a toy of the wealthy, now a necessity to all. Having cars, we naturally wanted good roads, with the result that almost every section of our Country is now traversed by magnificent highways.

It, of course, followed that these facilities, the automobile and highway, should be used for commercial purposes. Today, not only a very large portion of the passenger travel is by busses, but a considerable percentage of the freight traffic is hauled by trucks. As the capacity of the motor engine increased the busses and trucks became of such size as to monopolize almost the entire width of some of the highways. They are driven at terrific speed and frequently by careless drivers, with the result that they are not only rapidly destroying the highways, but are a constant menace to other users of the road.

Because so large a portion of the railroad revenue is being taken by the busses and trucks, I am naturally much interested, but so should every citizen be. The railways are so essential to the Nation that every one is interested in their growth. There are few persons who haven't a direct interest in the railroads, either by reason of ownership of stocks or bonds or through insurance companies and savings banks. These last-named institutions have their funds invested very largely in railway securities, and consequently every bank depositor or policyholder is indirectly a railroad security holder.

I do not suggest that the busses and trucks be driven from the highways, for I realize that as a means of transportation, both of passenger and freight, the automobiles are necessary and have come to stay. I, however, do feel there should be greater regulation of these busses and trucks, first, by limiting their size and weight and the reckless driving of them; and, second, by adopting a scheme of taxation which will cause those engaged in transportation by trucks to pay for the maintenance of the highways in proportion to their use of them. It is not fair for these users to pay no more than the general public.

Every citizen is vitally interested, not only in the taxes he pays, but in having the funds so collected properly expended. The constantly increasing taxes are causing or should cause every one great concern. Taxes are certainly a concern of the railroads, who are the largest tax payers. In 1928 the railroads paid $395,000,000 in taxes, an increase of 300 per cent over 1911. More than three-fourths of these taxes were paid to the state and local governments. If we are to reduce taxes or prevent their increase, it must be by a more economical standard of public expenditure. A large portion of the revenue of the state and local governments is spent in the construction and maintenance of our highways. May I urge that you give thought to these questions, and as leaders in your various communities not only study the facts carefully, but place them before your fellow citizens. If you will but undertake this, I am satisfied that you will obtain concrete results, which will not only benefit your particular section, but the entire Country.

Nothing will prevent the flowering of our wonderful Southland; but you who are leaders, by taking an active part in such matters, may do much to hasten this growth.

PHYSICAL AGENTS IN THE TREATMENT OF RAILWAY INJURIES*

By FRANK H. WALKE, M.D.,
Shreveport, La.

Railway surgeons have been the trail blazers in traumatic surgery, for largely through their work modern industrial surgery had its beginning. In times past, before the automobile and high powered machinery, the railroads furnished the greatest number of extensive wounds. Railway surgeons have been the boldest surgeons and they were forced to use all their skill and dexterity to cope with the maiming injuries of railway accidents. In accident work, other surgeons have welcomed the railway surgeon's advice, for the reason that his experience had taught him to obtain the best results in treatment of injuries. Again the railway surgeons have felt it their duty to get their injured back to work as quickly as possible, to lessen the economic loss caused by injury. The economic loss is not a negligible item, especially when wages are paid on a time basis, because when time is lost society as a whole suffers; thus accidents occurring even in the back shops have a direct bearing on transportation, which is the final and supreme function of railroads. Besides getting the injured back on their jobs as quickly as possible, railway surgeons must secure the most perfect end results. Bones must be set anatomically correct, scars lessened, function preserved, and complexes overcome. Therefore time is saved, convalescence hastened and disability lessened by the judicious selection and use of physical agents. With this in mind, a few methods and their indications will be discussed.

First, physical agents employed must be either thermal, chemical, mechanical or a combination of these. Thermal has reference to cold or heat, however applied. Cold, in the form of ice bags, cold packs or evaporating lotions is the means of keeping the temperature of a part below its normal to inhibit circulation and to abolish sensory nerve reflexes. Heat is applied by the use of hot water bags, fomentations, packs and poultices, also with radiant light, infra red, and with the high frequency current popularly called diathermy. Heat is indicated in conditions where a more extensive blood supply is needed to absorb exudates and drain inflammatory products. It serves to lessen venous congestion and quicken arterial flow. Heat may be used alternately with cold for sedation and for localization of inflammation.

Chemical agents are used for sterilization and for changing the chemistry of the body generally or locally as required. Ultra-violet or the actinic ray is a powerful antiseptic for infected wounds and a still more powerful equalizer of body chemistry in altered metabolism, particularly in cases of calcium and phosphorus deficiencies, since these elements are essential to tissue repair. Galvanism also is a potent chemical agent, but the effect is local rather than general. The galvanic current has distinct polarity; the positive pole is bactericidal, hemostatic and sedative, while the negative pole is caustic, vaso-dilating and irritating. Galvanism contributes stimulation, sterilization, sedation, vaso-dilation, vaso-constriction or irritation, depending upon the polarity used.

The mechanical methods of physical therapy are many. Rest is obtained by immobilization, splinting and support; vibration, massage and sinusoidal current; therapeutic exercise, active and passive motion, resistive and placid manipulation, and hydrotherapy along with other agencies which are neither thermal nor chemical. The mechanical side of physical therapy is sadly neglected because it takes some actual effort on the part of the surgeon. Most surgeons prefer to operate rather than to massage or apply mechanical measures, but these agencies often cure when operations do not. Mechanical measures are principally used to restore function following bone, joint or nerve injuries. Again a combination of thermal, chemical and mechanical measures is often necessary. A concrete example is that of a slow mending fracture, which may require diathermy, sinusoidal current and massage at the site of fracture, with body irradiation by ultra-violet rays to induce normal calcium and phosphorus metabolism. All of these stimulate callus formation, which is essential to the healing of broken bones. As no one remedy and no one operation will cure all patients, likewise no one physical agent will suffice for all conditions, but the use of combined methods may cure where one alone would fail.

To sum up the agents of physical therapy, the thermal measures are used to relieve pain, absorb exudates, relieve venous congestion and increase oxidation, raise the opsonic index and

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create a more positive chemotaxis. The chemical agencies are used for sterilization and stimulation and to increase metabolism and oxygenation, eliminating carbon dioxid and fixing calcium, phosphorus and other elements in the tissue. The mechanical agents are used to re-establish function and to re-educate and rehabilitate special parts long after they have been injured or have been in a dormant state. The combined agents are pressed into service to accomplish more perfect final results than one alone could give in patients who have received severe maiming injuries. The cases amenable to treatment are strains, sprains, contusions and lacerations; fractures and joint injuries, nerve injuries, burns and shock; osteomyelitis, indolent ulcers, infections, painful stumps and traumatic neurosis.

Strains, sprains and contusions are treated with either heat or cold, while lacerations are first sterilized by ultra-violet light before surgery is attempted. Fractures and joint injuries are treated with splints, rest, diathermy, manipulation and massage augmented by the sinusoidal and galvanic currents. Nerve injuries yield better to rest, heat and the sinusoidal current. Burns of an extensive nature heal readily after light irradiation, but some are exposed to ultra-violet for its stimulating effect upon granulation tissue. Shock is admirably treated by diathermy through the splanchnic area, provided internal hemorrhage is excluded. Diathermy with the administration of an abundance of fluid is a valuable remedy for any surgical shock. Osteomyelitis is treated with diathermy and ultra - violet irradiation after drainage has been established. Indolent ulcers are treated with radiant light, ultra-violet light and galvanism. Infections subside more quickly if ultra-violet light and the high frequency current are used. Painful stumps are best treated by hydrotherapy and the application of mild Tesla sparks to the sensitive areas.

Besides actual wounds, traumatic neuroses often exist. Physical therapy is almost specific for these complexes. The fact that something real is being done for the injury excites the confidence of the patient and induces in him a disposition to help himself. If patients are shown that they can be returned to their usual positions they are satisfied to fight, but if they are allowed to go about brooding over their fate, they convince themselves that their earning capacity is lessened. Thus they become menaces to society. Many physicians say that complexes are only temporary and that patients will eventually find themselves and realize that their troubles are only imaginary. Perhaps this is true, but how long will it take? Keeping the patient satisfied is a means of preventing neurosis, and perhaps salvaging some who are likely to enter into a state of utter uselessness. So physical therapy can be applied to the mental as well as the physical injury with excellent results.

The outfit of the railway surgeon need not be elaborate nor expensive. Much can be done with a comparatively small amount of apparatus, although no one therapeutic agent can do all. A minimum outfit would be: one radiant light, an ultra-violet unit, an infra-red lamp and a standard high frequency machine along with apparatus for galvanic and sinusoidal current. This equipment can be added to as necessity demands, and duplicate apparatus is advisable where large numbers of cases are treated. Some surgeons complain that physical therapy apparatus is expensive. This is true, but it must be remembered that all surgical instruments are costly and a small fortune can be expended in them. Many special instruments are high priced, and perhaps they are used only a few times during a surgeon's career, but they are then a dire necessity, for a life may be dependent upon their presence. Physical therapy equipment is economical, because the most expensive part of it will last an ordinary life time if properly cared for. The parts which wear out are replaceable at a nominal cost and can be figured in with other things which constitute overhead expense.

The results obtained through physical therapy are speedy, certain and positive. Surgery can perform limited service only, and the surgeon's obligation does not stop with the healing of a wound, the uniting of a fracture or the restoration of a nerve. It is his plain duty so to conduct the case that the patient may resume his usual vocation or else be fitted to do some form of profitable work. The injured must be put back to work after a minimum loss of time. Should permanent disability follow an accident, rehabilitation should be hastened so that living wages can be earned even if the original occupation is not resumed.

Physical therapy is a distinct specialty within itself, but one must not lose sight of surgical principles. Conservatism and due regard for tissue structures should be considered first. Industrial wounds are more severe than ordinary

wounds, and tissues are traumatized to a greater degree so that more than ordinary measures are required to induce healing. Physical agents give zest to the mending of such wounds, besides lessening the pain and suffering which go along with them. Function is more quickly restored, and patients are returned to their work with a minimum amount of lost time.

As this is an age of industrial revolution and progress, so physical therapy has enabled the surgeon to revolutionize the treatment of modern industrial wounds. Also the use of physical therapy has an excellent effect upon employes. They realize that if they take on a little more hazard in their daily routine and an accident befalls them, they will be cared for in a proper and scientific manner. Physical therapy puts down that mental unrest which to a larger or smaller degree always exists between capital and labor, and it cements a more friendly relation between employe and employer. The men are better satisfied with their positions and strive harder to serve their employers because they appreciate the fact that they will receive the most effective treatment should accident overtake them. Last of all, the surgeon himself has given all helpful measures possible to his patients and the realization of duty well performed is the greatest consolation and comfort that one can attain.

This is the value of physical agents in railway practice.

WHERE DO WE GO FROM HERE?*

By J. W. SIMMONS, M.D.,
Brunswick, Ga.

Demosthenes, no doubt, when speaking to the Greeks before the Areopagus, "pointed with pride and viewed with alarm." Probably Cicero thundered the same sentiments among the hills of Rome. Every age and every nation has suffered from the same alarming complex, yet we continue to pursue the rather even tenor of our ways, and nothing really devastating in the way of the expected catastrophies has come upon us.

There are a number of rather striking changes coming about in our civilization in America that vitally affect the future of the practice of medicine as a science, an art, and, above all, as a commercial or professional engagement. I am just wondering if most of us really appreciate the fact that we are out of joint instead of the times being so. We are threatened from without by a pressure we have never known before. We are emerging, so to speak, from mysticism into commercialism, a sphere which we have hitherto sedulously avoided. To make myself clear, I am going to propound a number of questions, and then try as I may to answer them. Your answers or explanations will be just as good as mine, and my only purpose is to set you thinking in order that we all, working together, may find solutions to many problems, or avert a seeming impending catastrophe by not remaining entirely indifferent to the trend in affairs that is bound to affect us all.

Are we really headed for state medicine? Is the paternalistic tendency manifested in the desire of the general public to have the political entities either furnish, exercise supervision of, or control of, health matters, highways, schools, public utilities, hospitals and what not, going to develop into such a socialistic or communistic scheme as to prompt them to attempt the nationalization of the practitioners of the healing art, forcing us to do our business altogether according to their ideas as to how our business with them should be conducted?

Is the present day tendency toward over-specialization, which is being fostered to a certain extent by our medical colleges in their intense technical training, research and specialization of skill in elective branches, going to increase the cost of medical care so far as the physicians' share in that cost is concerned, and gradually eliminate from our ranks that "man of all parts," the family physician of a generation ago?

Can we hazard a guess as to what will be the outcome of the present five-year program of investigation on the cost of medical care? Can we not from our own drug stores, local hospitals, nursing staffs and medical fraternity, to say nothing of the other items concerned in the cost, come fairly close to "doping out" the truth of the matter? Will it prove, as one writer has said, that the average American who must afford the price and upkeep of an automobile, must, at the same time, be the beneficiary of community medicine because his budgeted income does not include the high price of being sick or having any of his family ill? Is it a fact that American citizenry can be roughly divided into two classes, namely: those who support automo-

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biles and those who are supported by welfare organizations?

Just where, in this age of workmen's compensation laws, bureaucracy, commissions, lay activities in purely medical matters, associations for the promotion of this, that and the other beneficent protection for the long-suffering and complaining public, does the physician find his rightful place? Whose doctor is he, anyway? And whose patient in industrial, communal, commissional, clinical or organizational lay activity, is he treating? Is curative and remedial medicine, as well as preventive medicine, the function of health boards?

Just where will end the thousands of attempts in various state legislatures throughout this Country, all fostered by misguided and, in many instances, ignorant, enthusiasts to alter, abridge, amend or abolish, as the case may be, the responsibilities, the privileges and rights of the regular practitioners of medicine and surgery? Can we appreciate an attitude that would seek compulsory legislation through which fees for certain services are fixed arbitrarily and fines or imprisonment visited upon those refusing to give such service?

Will it be possible for all organizations and agencies concerned with the conservation and preservation of the public's health, individual and collective, to establish proper mutual relationships that will satisfactorily safeguard the duties and responsibilities of each without infringement on the rights or amenities of any? If the average income of the physicians of the United States is only $2,000 per annum, and I am reliably informed that such is the case—(a shameful and ridiculous remuneration it is)—what is the chance of raising this average to a decent amount without imposing any addition to the cost of average medical care?

Cannot we create some ethical rules governing the wholesale broadcasting of medical advice over the radio and through the printed pages of our magazines and newspapers, whereby these great media of publicity may not appear in the role of family adviser in matters medical, but servants of the greater good through the right sort of broadcast or printed advice?

Now, harking back to the question of the suggestion of state medicine, it cannot be questioned that in many countries of the world attempts have been, and are being, made to socialize, subsidize and so definitely control the practice of medicine and surgery as will prove tantamount to making of the physicians anything but free and independent professional entities. While it is true that the medical profession as represented by the non-sectarian and regular physicians is vitally interested in any legislation that will make the prevention and treatment of diseases surer, safer, saner and more scientific, the public at large does not seem to get that idea of our endeavors. We are accused of being selfish lobbyists and propagandists, even in the highest legislative body in the world. I might cite the instance of Senator A. W. Barkley, of Kentucky, whom I am proud to claim as a friendly acquaintance, who, while defending the regular physicians of the Country against unjust legislation, was met with the remark on the part of Senator Smoot, who led the fight against us, "I congratulate the doctors upon being the most persistent and best propagandists among all classes of people in the United States." If so learned a man as Senator Smoot could so misunderstand our mission, our purposes, our ethical relations in the body social, politic and economic, how much more might the legislators of the several states look askance at any of our activities in the matter of either initiating legislation for the general benefit of the public or combating such legislation as might be palpably harmful to our profession directly and much more so to the public indirectly?

I firmly believe, Will Rogers to the contrary notwithstanding, that the average intelligence of our national congress is so high that we will have nothing to fear from them, but allow me to call attention to a few bills that were offered for passage in some of the 43 of the 48 states the legislatures of which met this year:

In my own State of Georgia a bill was introduced, and died, that proposed to limit a physician's fee in ordinary labor cases to $15.00 and would have made the refusal to attend such a case when called, by reason of the compensation set out in the bill, a misdemeanor punishable by fine or imprisonment, or both.

Attempts were made in six states to put through bills proposing that all public institutions and hospitals supported wholly or in part by public revenue, or exempted from taxation, should accord equal privileges to practitioners of all forms of the healing art. Arkansas actually did open up such institutions both as to practice and office holding in them to osteopaths. Several other states have passed, or will pass the same laws, as they appear on the face

of them equitable to the general public clientele of all cults and faddists.

The Governor of Nebraska vetoed a bill which would have permitted railroad companies to issue free transportation to physicians and surgeons actually employed by the companies and to dependent members of their immediate families. Think of it! Both a distinction and a difference in the rights of employes!

The public doesn't want protection from ignorance, as shown by the fact that, while basic science laws were enacted by Congress for the District of Columbia and by the Legislature of Arkansas, our uniform law covering basic sciences failed in seven other states, my own among them.

Naturopathy has come into popularity with several state legislatures, and we may look for more boards and bureaus as fast as the cults develop their clientele. The State of Washington's Legislature created a state committee of sanipractic examiners and provided regulations for the practice of sanipractic (whatever that is). The chiropractors have succeeded in getting favorable recognition by the legislatures of nearly every state in the union. Station WOC at Davenport can now "put that on the air."

Approximately 2500 bills on an amazing variety of subjects considered in sessions of the 43 states all affected directly the practice of medicine and surgery. We certainly cannot complain that the legislators are not thinking about us, but how they are thinking! For the protection of some of them we are truly grateful; because of the attempts of many of them to regulate us, we should be forewarned.

Regarding the marked tendency toward specialization, and the association in some centers, which is advised by many as of universal application, of such specialists in so-called group practice, might I hazard the opinion that the conveniences, the economies and sometimes the efficiency these physicians find in such practice is not passed on to the patient who is examined, tested with various instruments of precision, passed through the x-ray and chemical laboratories, test-tubed, and so forth, with a separate or combined charge or charges for each service. The test to the average patient of service is results, and costs commensurate with them.

Mark you, I am not decrying the absolute need of specialization in the abstract. Some specialists are positively gifted, but I do think that every specialist should have served a certain time as a general practitioner, in order that he might get the proper perspective, so to speak, from that viewpoint, and recognize the thousands of different types of sick humanity, each with his own individual body and functions thereof, his individual mind, all constituting a well-arranged, well-ordered and interdependent group of organs and functions gone wrong somewhere; and not as a stereotyped assembly of mechanical entities or parts in which the specialist may only find that nut number 243, to which he devotes his time and study, has become loosened and needs tightening, just as the mechanic in an automobile assembly line might become expert in his particular job without knowing a thing about any other part of the machine.

My boy, or your boy, in a medical school or taking a pre-medical course today is doing intensive research and original work in biology or comparative anatomy that you and I never dreamed of. His hours of laboratory will probably exceed those of didactic instruction and clinics. He will come out of college with a knowledge of tests, signs, chemical reactions, and will possess an instrumental technic and laboratory acumen that will so far exceed his plain, ordinary, common sense, reason and personal judgment as to render him almost helpless away from laboratories and hospitals equipped with every technical facility; while you and I have dealt with emergencies, some of them in rural districts, that would have chilled the hearts of the strongest men. No wonder we cannot get any of the new crop of physicians into the rural districts.

The science and art of medicine have traveled on the wings of the wind, but I fear the organizational and commercial, the economic side, if you please, has drifted far in the rear. There is something in the spirit of the age we have not caught. Maybe we are too honest, too Utopian in our views, too humanitarian in our general attitude, without having attracted attention to ourselves as possessing these virtues.

Let us consider now as rapidly as we can our moral obligations in medicine, "Deontology," as the President of the American Medical Association so euphemistically and enphoniously called it in his Portland address. Particularly let us discuss it as it relates to the cost of medical care in physicians' fees for service to the average citizen of the South, as well as in our rela-

tionships of professional service in industrial practice.

In every state of the Union now, save two, workmen's compensation laws are in effect. They are not uniform, but the general scheme and purpose of these laws is beneficent and philanthropic, yet in the operation of some of their provisions in the strict legal interpretation of them, injustices to all parties concerned are often worked. The employer, the employe who is injured, the insurance carrier and the physician each at times finds just cause for complaint. While the laws are primarily framed for the protection of both employer and employe, they nearly always show evidence that, while the industrial surgeon is the most important link in the chain of rehabilitation and reconstruction, with compensation and other benefits directly related to the kind and character of service he renders, his professional advice was not sought in their construction, nor his judgment asked in their administration.

The railroads of the Country were among the first of the great industries to realize the fact that they owed some duty in the matter of surgical care to their injured employes. They realized also the necessity of pre-employment examination to weed out the unfit; not in order to deprive workmen of the right to work, but to protect the workman himself, as well as his fellow employes and possibly the patrons of the railroads, from the potential hazard of a subnormal, abnormal and unfit worker in a place of more or less responsibility. The absolute justice of the attitude of the railroads toward such examinations and re-examinations cannot be questioned; nor can the same attitude on the part of industries following this plan of selection and retention of their employed personnel be justly criticised. Sentimental inclinations might prompt us to pity the sick, the afflicted, the subnormal, the cripple, the blind and the maimed, but it cannot be expected that industry will put them on the payroll; rather would industry contribute cash for this rehabilitation, sharing such cost with other interested parties.

The South has seen within the last few years an influx of industry from other sections and a development by her own capital of her own resources through industry beyond that experienced by any other section of the United States during the same period. As interested Southerners and more or less skilled medical men it is our duty to see that our working classes are made the equal in health, intelligence and morals of those of any section of the world. Upon us rests this responsibility of cooperating with every agency to lower out morbidity rate, and this we often are striving to do without the cooperation of those whom we are trying to assist, and often over their protests.

In railway surgery and practice we know what we have been doing. Industrial surgery and practice is still somewhat chaotic. Italy has created chairs of industrial surgery in her medical schools, has established special medical boards to study industrial injuries, occupational diseases and other problems that arise to harass the hosts of industry. Most railroads have already worked out plans of relief for their employes and their families when sickness or accident comes upon them, their surgeons are functioning with the finest spirit of cooperation in this work, as well as in all safety campaigns, with loyalty both to their employers and their patients. There is a certain altruism on the part of the railroads toward their employed, which, in the absence of disturbing elements, provokes a loyalty on the part of employes that is rarely found in other industries operating perforce under the provisions of many compensation regulations. For instance, the Atlantic Coast Line Railroad Company, since the establishment of its Relief Department thirty years ago, has expended a total of $6,110,790.90 in sickness and accident death benefits, disablement benefits, surgical attendance, hospital and dispensary maintenance, not including $1,494,-527.84 in cash payments by the railroad company for the establishment, operation and maintenance of the Relief Department. The appealing feature about this benevolent activity is that the money the employes pay voluntarily in providing part of the cost of these benefits for themselves and their families makes them feel a certain pride and independence even in affliction from accident and disease, that cannot be felt by employes under any other system of relief than that which they themselves assist in providing.

The average annual wage in 1925 of 30,000,-000 industrial workers in the United States of America was $1,250, or $104.16 per month. It has, no doubt, increased slightly since that year. Considering this average and a certain amount of unemployment among this one-fourth of our total population, is it not reasonable to suppose, as practically all of the workers live in urban districts where living costs are higher due to the luxuries that make up the American

standard of living of which we boast, that even an exceedingly small cost for medical care will materially upset the usually improvident family budget? Speaking of this cost, if the rich pay too much for it; the poor get it for nothing; the great middle class can't afford it, what has the medical profession to offer in the way of a solution?

If, as so many writers have said, we of the medical profession have a natural monopoly in the art of healing and feel so deeply the responsibility of seeing that no one is deprived of the use of our wares or output, what means or methods are we to adopt for the fulfillment of an obligation that does not rest upon the grocer, the landlord, the clothing merchant, and even the automobile dealer? Is the cost of medical care included in the necessities of civilized man among those of shelter, food, clothing? In industry should it be charged as overhead, maintenance of the machinery-human of the plant?

No civilization can rise higher than the average standard of its medical men. The old witch doctors, the groping alchemists, the barber bleeders were all just a step ahead of the intelligence of their ages, and it seems possible and altogether probable that in America the average medical standard of intelligence and skill, as well as ethical conduct, have risen higher than the ability of not only the average citizen, but of some of the intelligentsia to understand and appreciate them. For this reason they would curb us, they would over-regulate us, they would advise us to become more commercialistic, they would socialize our service of science and art; forgetting that under such circumstances as they suggest ambition would wane, incentive would die, and mediocrity mark the masses of us for its own.

Medicine has always had its critics, but recently the rank and file of the profession have been the recipients of some rather startling advice from sources so high we cannot afford to ignore them, while we cannot afford to accept the kindly suggestions made. In the October 19, 1929, issue of the *Journal of the American Medical Association* (page 1247) there was printed a condensed report of an address delivered before the American Hospital Association Convention at Atlantic City by Mr. Edward A. Filene, President of William Filene's Sons, Boston, Mass. The speaker states boldly that the cost of medical care among the working classes is a potent factor in the causation of social unrest, with an intimation of the opinion that physicians' fees are probably a major item in the burden of illness.

He continues:

"Something must be done about this situation by the medical profession or the public will take a hand in it, as has been done, none too successfully, in some of the leading European nations. And let me say with all the emphasis I can command that I prefer voluntary action to state enforcement in this and every other field."

In suggesting the quantity production of medical care with a minimum budget for the means of providing it by pooling resources and expenses on the part of his so-called "medical guild," Mr. Filene, by providing each physician with 267 patients at $6.25 per month, sick or well, and with ten regular health examinations per week to keep them as well as possible, shows that an annual income of $20,000 could be assured the physician. Quite a bit more than the average of $2,000.

The modern "family doctor" would be, according to the hypothetical plan outlined, a group of specialists, "which, while it can never, of course, convey the sense of individual personality to its patients, it might, at least, furnish a single organization which would administer to their ills. They would feel that in going to it they would get the best kind of treatment no matter what their ailment might be. It would also apply to the practice of medicine those basic principles of scientific management which have worked such wonders in the business world."

Now, there you are, with a page of big business suggesting the end of one road to us. Shall we travel it?

Mr. Henry Ford, who certainly typifies the success of basic business principles of production, advertising, utilization of the prime business laws, as well as the appeal of easy payments on his production, and who might be pointed to as a fairly successful American citizen, also pauses long enough in his souvenir hunting and philosophizing to regale the newspaper reading public with a few suggestions as to how the medical profession might raise itself from the quagmire of antiquated ethics and antique business methods and practice.

This manufacturer would have the profession entirely standardized, without recognition of the limitations of medical science and art which is inherent in the conscientious regular practitioner. He would also have us exploit untested and unproved remedies and methods, and attributes to most of us a tendency to reject many of those things which the public had an inkling of as promising much relief, because we prefer

our old and accustomed methods of treatment, in which we are steeped to the extent that we have not time to become informed about new and better methods.

Mr. Ford seems to think we have something up our sleeve. Because the patent office records show that ethical practitioners of medicine and medical scientists have not seen fit to commercialize their inventions and discoveries and advertise them, but have given them freely to the world through every intelligent physician, the profession is indicted as unbusinesslike. The question is pointedly put to Mr. Ford by *California and Western Medicine:*

"Had Mr. Ford applied the same code (the code of honorable, helpful ethics of the medical profession) to his own discoveries, it would not have been possible for him to amass the millions which came to him, because of his monopoly, had every other automobile manufacturer been free to use his discoveries."

These criticisms have been cited to show that the public expects some change in our methods of doing business. Certainly we can afford to show them that there is nothing unethical in adopting some of their ideas. We can, with all propriety, create more business for ourselves by revamping some of our ideas of ethics, and, at the same time draw ourselves closer to our families in our clientele, our industries, our industrial patients, our railroad employers by making ourselves a little more "officious," so to speak in suggesting to them various ways in which we can constantly be of service to them in preventive medicine, accident prevention, rehabilitation, shortening labor lay-offs, and so forth, and still retain our self-respect.

However diligently we may seek to enlarge our usefulness, increase our service, reduce its average cost to those who need it most, fill our rightful place in our several communities, we will not find it in that road that leads to a combination or monopoly the stocks and bonds of which will be quoted in Wall Street as the Great American Medical Amalgamation, with dividends paid to, and melons cut for, the organizations workers, who are its stockholders; but in that strenuous individual competition as to who can best serve, reach higher ideals, practise the noblest altruism, love most his fellowman and realize to the fullest his individual responsibility to live with a conscience void of offense toward God and his neighbor. Hippocrates gave us this injunction, and no man, however high he may stand in the spotlight of history, can give us a better code.

LOOKING FORWARD*

By F. J. Eichenlaub, M.D.,
Washington, D. C.

Many dermatologic problems await solution. Some are peculiar to the South, as creeping eruptions. Some are a greater problem to the Southern dermatologist than to others, as the ringworm infections. Others are common to dermatology the world over: the cause of pityriasis rosea, psoriasis, the cosmetic dermatoses, and so on.

Each of us will do his best to solve these problems individually. But all of us are necessarily limited in our efforts by lack of material for study, lack of laboratory facilities, and lack of time because of the necessity of earning a living.

If, however, this group of men banded together to promote knowledge in its field, were to work as a group on the solution of some one problem, the united efforts of all of us might produce results which our single efforts would fail to do.

The cause of creeping eruption has been definitely established through the efforts of some of our own members cooperating with Government scientists. The treatment is still unsatisfactory, but it might be made successful if all of us were to use one method after another until its usefulness was established.

The group of cosmetics produce a very large number of dermatoses in the aggregate. Desirable or not, cosmetics will continue in wide use. We can solve this problem only by making sure that our patients use cosmetics containing harmless ingredients. I would suggest that a committee from this Section cooperate with one or more of our National pharmaceutical firms to work out formulas for cosmetics and secure their manufacture, with a description of the contents on the receptacle.

The ringworm problem is the biggest one before us today. Like the common cold, it is always with us. We have no definite or satisfactory classification of the organisms. Our knowledge of the epidemiology is largely surmise. Treatment is empirical. We cannot hope to solve all these questions in a year, but we can and should make a concerted effort to at-

*Chairman's Address, Section on Dermatology and Syphilology, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

tack them. I propose that we make a start by assessing ourselves a definite sum each year to pay the salary of a competent mycologist. Such a man, working in conjunction with each of us, should be able to determine the organisms most commonly encountered, classify them simply to our own satisfaction and perhaps develop aids in treatment, such as tricophytines, which would directly help our patients. I have no doubt that any of our universities would give us laboratory space. The contribution should, of course, be passed on to those of our patients who would benefit by the work done. I recommend the appointment of a committee to investigate the possibilities of carrying out such a proposal.

Most of us, I think, have the impression that pityriasis rosea is an infection. The only positive information on this, however, is the inoculation experiments of Dr. Udo Wile. While individually we may not be able to discover the infective agent, it seems not improbable that if a large number of us took scrapings from the mother spot, the general eruption, and took blood cultures and carried out inoculation experiments wherever possible, the causative organism might be discovered. And so with many other dermatoses.

There is one other way by which united action will promote our knowledge. If, in addition to the individual contributions to knowledge, we build part of our program around the development of one definite subject each year, assigning the various phases to different members well in advance of the meeting, I believe our annual meetings will become more valuable to everyone.

With the modest beginning here suggested, it is my ambition to see developed an institute which will be an aid to all of us in our practical and research problems. Such an institute would enable us to try out quickly and evaluate any new drugs or procedures by tabulating the results of all its members. One man may be interested in securing samples of blood from an uncommon disease. His request, with suitable collecting apparatus, could be sent to all our members. Another might want cultures, another biopsies from some disease in which he was interested. Through such a clearing house all these aids might be secured. Special bacteriologic, mycologic and chemical work could be done. The many ways by which this might be of practical help can only be touched upon.

Most of us live in communities which cannot support research work. Even in the big universities it is difficult to get the cooperation necessary to carry on dermatologic research. Our only hope, then, is to develop for ourselves a means of carrying on. Cooperation and concentration of effort are the watchwords of the age, and while mass effort can never replace individual genius, it can stimulate and aid it.

If we will unite in our work, attack our problems one by one as a group, and work together for their solution, I believe we may look forward to the future with the assurance that our share in the development of our specialty will be a great one.

Columbia Medical Building

PROGRESS OF UROLOGY IN THE SOUTHERN MEDICAL ASSOCIATION*

By RAYMOND THOMPSON, M.D.,
Charlotte, N. C.

Ten years have elapsed since we first organized the urologists of the Southern Medical Association into a special Section, and it may be well to review the history and accomplishments of this period in order to set our course for more rapid progress in the future.

Dr. Hugh H. Young, that outstanding leader in our special field in America, was the official presiding parent of the organization meeting in Asheville in 1919, and by his inspiration and advice, coming from his wide experience, launched the new enterprise on its way, speedily, wisely and well. Official assistants to Dr. Young were Dr. Joseph Hume, of New Orleans, Vice-Chairman, and Dr. E. P. Merritt, of Atlanta, Secretary, who had a vital part in the organization.

Dr. John T. Geraghty was elected Chairman for the subsequent year, the meeting being held in Louisville. By this time the Section was a well recognized integral part of the Southern Medical Association, the attendance was much larger and a full scientific program was given. Dr. Geraghty was always an active figure in the subsequent sessions until his untimely lamentable death in 1924.

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*Chairman's Address, Section on Urology, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

Following thereafter, Dr. A. J. Crowell headed the Section at Hot Springs in 1921, Dr. E. G. Ballenger at Chattanooga in 1922, Dr. H. W. E. Walther at Washington in 1923, Dr. A. I. Folsom at New Orleans in 1924, Dr. George R. Livermore at Dallas in 1925, Dr. W. J. Wallace at Atlanta in 1926, Dr. Perry Bromberg at Memphis in 1927, and Dr. Bransford Lewis at Asheville in 1928.

To the vice-chairmen, secretaries, local committees in charge of arranging for the meetings, scientific exhibits and clinics, as well as the efficient Secretary-Manager of the Association, Mr. C. P. Loranz, are due a large part of the credit for the smooth working of the Section's entire organization.

Numerous leaders in urology of this and other countries have participated in the programs and made them more profitable. Among these may be mentioned McCarthy, Bugbee, Keyes, Cabot, Braasch, Kretschmer, Joseph, Lower, Quinby, and others.

The influence of this Section has been of great value towards developing the specialty in the South. As clinic groups and hospital organizations multiplied and grew, so the urologist and genito-urinary surgeon became of greater importance in these groups until now the specialty is well recognized and there are at least six hundred men in our territory confining their work to this branch of medicine and surgery. These meetings have also given the younger men an opportunity to express themselves from their own experience and research observations. They have been taught to be not only better diagnosticians, but better surgeons. The Section has proved an excellent opportunity for contact and acquaintance of the active workers in their common field in the cities of the various Southern states, and has assisted very materially in the management and treatment of patients who are obliged to move from place to place. These meetings have stimulated among our members greater interest in post-graduate study and original research.

There has been a general raising of the plane of the management of patients in this field and modern approved methods have become better understood and popularized. The surgical results obtained have improved decidedly and compare favorably with those obtained in some of the older and larger centers. It is well recognized that the great bulk of urologic work will always be done by urologists in the locality from which the work arises, and it is therefore extremely important that this work be done by men as well equipped and as well trained as possible.

By the unstinted effort and leadership of these men, the Section has now reached a position of importance in the Association, the growing numbers of urologists in the South have evidenced their interest by their greatly increased attendance and the quality of the scientific programs has gained in excellence.

In reviewing the elevating influence that this Section has had upon the type of work being done in our specialty in our territory, it is meet and proper to hope and to predict that the Section on Urology will continue to make better urologists and to raise the entire tone of urologic practice. It is to be hoped also that it will continue to stimulate its members to further post-graduate study and to greater attainments in research investigations.

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EDITORIAL DEPARTMENT

SOUTHERN MEDICAL ASSOCIATION
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Louisville, Kentucky, November 12-14, 1930
Pre-Meeting Clinics, November 11, 1930

THE LIVER IN ECLAMPSIA

The number of cases of eclampsia is much smaller now than it was a few years ago, though obstetrical mortality statistics are still figures for lamentations. Education of the prospective mother, and ante partum care, have reduced the mortality, and it is probable that eclamptics will become increasingly rare in practice.

The condition now is observed most frequently in sparsely settled communities rather than in urban areas,[1] and in the less educated or the needy, who do not come early under the physician's care. Its occurrence among these women is another reminder that "the poor cannot afford to economize" either their money or their health.

Its relation to liver injury is pathologically established, and diagnosis of early liver damage would no doubt be helpful for pointing out potential cases. Because the liver has a large margin of safety, extensive liver damage is possible in patients who appear normal, and liver functional tests may show no injury even when much liver tissue has been destroyed. Of various tests tried in a series of cases, Cross,[2] of Tulane, reports that retention of the dye, bromsulphthalein, was most useful in pregnancy. This test was usually negative in normal cases and positive in cases which later developed complicating symptoms.

There is a characteristic lesion associated with eclampsia, the result, according to Dieckmann,[3] of conditions in the portal capillaries which favor coagulation and thrombosis. Dieckmann attempted to produce similar liver destruction in pregnant dogs by giving them full rations of raw meat daily for a period and then injecting tissue fibrinogen or lung extract intraperitoneally. Frequently pain and convulsions followed the injections. At necropsy, a liver lesion was seen which was not typically eclamptic, but was due, he believed, to the same mechanism which caused the eclamptic liver lesion in women. The substances bringing about thrombosis in women, he thinks, must have their origin in the intestinal tract. Therefore, one should limit the ingestion of meat in the last months of pregnancy to avert a fulminating eclampsia. This is in accord with the practice of many years among obstetricians.

Minot,[4] of Vanderbilt, has shown that carbon tetrachlorid is quite toxic for normal dogs and causes rapid and serious damage to their livers, if they have previously received a high meat ration. The liver seems to be sensitized by the meat to the action of this poison. If the animals previously received plenty of bones, that is a ration rich in calcium, the frequency of liver damage was greatly reduced.

A bread and milk diet, or one to which calcium salts had been added, likewise prevented the convulsive seizures which accompanied liver injury; and intravenous calcium salts relieved the distressing symptoms.

Atrophy and hypertrophy of glands other than the liver are reported in pregnancy. The thyroid and pituitary have come in for their share of discussion. Partial destruction of the parathyroids in pregnancy has been reported, and in tetany of pregnancy parathyroid lesions have been noted.[5] Of four cases of eclamptic convulsions which came to necropsy three had abnormalities of the parathyroids. Hemorrhagic

1. Shears, G. P.: Obstetrics, Ed. 4. Philadelphia: J. B. Lippincott Co., 1924.
2. Cross, R. C.: Study of Various Liver Function Tests in Normal Pregnancy. Amer. Jour. Obst. and Gyn., 18:800, Dec., 1929.
3. Dieckmann, W. J.: Further Observations on the Hepatic Lesion in Eclampsia. Amer. Jour. Obst. and Gyn., 18:757, Dec., 1929.
4. Minot, A. S.: Relation of Calcium to Toxicity of Carbon Tetrachlorid in Dogs. Proc. Soc. Exper. Biol. and Med., 24:617, 1927.
5. Lopez, R. E.: Parathyroid Extract-Collip in Eclampsia and Allied Conditions. Surg., Gyn. and Obst., 49:689, Nov., 1929.

lesions, atrophy, reduction of the number of glands, have been noted from necropsies of eclamptic cases, and calcium deficiency was long ago suggested as the cause of eclamptic convulsions.

Lopez,[5] of New York City, has reported the successful treatment of five cases of eclampsia parturientum with parathyroid extract. Calcium is not always lowered, he says, in parathyroid deficiency, and on this ground he justifies his administration of the extract to eclamptics whose blood calcium was normal. One of the patients is described as having entered the hospital in coma, with a temperature of 105 degrees and in clonic convulsions. Fluids, morphin and parathyroid extract were given, with immediate improvement of symptoms, increase of urine output and reduction of edema. The parathyroid extract initiated a diuresis usually the second or third day after its injection, which increased for four or five days till the edema disappeared. In two cases there was a reduction of 40 mm. in blood pressure. The subjective symptoms disappeared with the edema. Two cases were in convulsions, which ceased after the first injection. In no case was labor started, but in one case in which pains had begun labor was postponed. Of the patients who came into the hospital with a live fetus, no change was observed in the fetal heart sound. Calcium in the serum showed no appreciable increase during treatment.

Of course, "one swallow does not make a summer," nor in this instance can five swallows. Morphin and rest must have played their parts in allaying the symptoms of these patients, though Lopez seems more than willing to believe that the diuresis obtained by administration of parathyroid extract was specifically beneficial.

It is worthy of note that parathyroid extract in the dosage employed for these very ill women had no obviously injurious effects.

Lamson,[6] in this issue of the JOURNAL, although he calls attention to the grave dangers of intravenous calcium, mentions the case of an eclamptic whose convulsive seizures were controlled by it. Presumably, parathyroid extract would have the effect of increasing the blood calcium.

Reduction of meat intake in pregnancy and increase of the consumption of milk, which has a high calcium content, are probably useful measures for the prevention of eclampsia. For conservative treatment of the fully developed condition, the various medical measures which induce physiological rest are probably most helpful.

6. Lamson, P. D.: Results from Pharmacological Studies of Normal and Pathological Liver Conditions. S.M.J., this issue, p. 93.

FURTHER CANCER STUDIES

"It is better not to apply any treatment in cases of occult cancer; for if treated, the patients die quickly; but if not treated, they hold out for a long time," said Hippocrates.[1] One does not believe now that internal cancer is better left alone, but there have been advocated treatments in recent years which hastened rather than postponed the death of the patient. Many false steps have been made during the progress of cancer research, and some of the forms of therapy introduced have been harmful.

The theory of its infectious nature rises and falls in popularity. In a moving picture ten years ago was shown a character portrayal of an eminent scientist. One "close up" displayed him intently gazing through a microscope, where, the legend underneath said, he had been searching all night for the germ of cancer. A well-informed physician in the audience explained to his companions the error of the situation; for no eminent scientist at that time would search for the germ of cancer. Eminent scientists had agreed that although little was known about its causation, one could at least say definitely that cancer was not an infectious disease. It was perhaps due to chronic irritation.

Came Gye[2] and Barnard,[3] in England, with a world-heralded ultra-microscopic organism cultivated from cancer tissue only and regularly producing cancer upon inoculation into normal subjects. Came Nuzum,[4] with another organism, a gram-positive micrococcus. It also was obtained only from malignant tumors, and produced a malignant growth on inoculation into

1. Adams, F.: The Genuine Works of Hippocrates, p. 256. New York: Wm. Wood & Co., 1922.
2. Gye, J. E.: Etiology of Malignant New Growths. Lancet. 209, p. 109, July 18, 1925.
3. Barnard, J. E.: Microscopical Examination of Filterable Viruses. Ibid. p. 115.
4. Nuzum, J. W.: Experimental Production of Metastasizing Carcinoma in the Breast of the Dog and Primary Epithelioma in Man by Repeated Inoculations of a Micrococcus Isolated from Human Cancer. Surg., Gyn. and Obst., 40:343, 1925.

animals. Came a young interne who died apparently from direct cancer inoculation.

No organism has yet been confirmed by several laboratories as fulfilling Koch's three laws for a specific disease-producing agent. Yet now, few in the medical profession would say that cancer will never be demonstrated to be an infectious disease. The scientist may search if he will for the germ: and no one can feel certain that he will not find it.

From the Cancer Clinic of the Pasadena Hospital, in California, have appeared a number of pieces of research upon malignancy. Stearn, Sturdivant, and Stearn[5] have examined a microorganism isolated from malignant and never from non-malignant tumors, like the previously mentioned cancer bacteria. They do not claim to have found the specific cause of cancer, but describe at length the ontogeny of their organism, its characteristic variation in morphology and cyclic development. Whether or not it is related in any way to the etiology of malignant disease, it is worthy of study as a new bacteriological specimen.

A number of characteristic differences between benign and malignant tumors have been pointed out. Their enzyme contents vary. Their utilization of glucose is not the same. They differ apparently in their effects upon tissue growth in cultures.

Burrows,[6] also of Pasadena, has for years advocated a nutritional theory of the origin of cancer. Malignant tissue differs from normal tissue, he says, in containing little or no fat-soluble vitamins. Excess of these vitamins inhibits tissue growth, which is stimulated by another vitamin. If there is more of the growth-stimulating than growth-inhibiting substance, the tissue becomes cancerous. Filtrates of a rat sarcoma contained the growth-stimulating substance but no fat-soluble vitamins for inhibition of the growth impulse. In feeding tests upon animals, these malignant filtrates seemed to be non-toxic but were deficient in the fat-soluble principle. Burrows describes a series of cases of malignancy in which cancer always developed after dietary deficiencies. Many preceding attempts to associate diet and tumor growth have been submitted.[7]

In any consideration of the etiology of cancer, the work of Maud Slye[8] upon its inheritance should be brought to mind. The nutritional, bacterial, irritation, and inheritance theories are not mutually exclusive. One must keep his ear close to the ground to learn what in cancer research belongs to the scrapheap; and what survives is gold.

5. Stearn, E. W.; Sturdivant, B. F.; and Stearn, A. E.: Ontogeny of an Organism Isolated from Malignant New Growths. Jour. Bact'y, 18:227, Oct. 1929.
6. Burrows, M. T.: Further Notes on the Relation of Nutrition to the Development of Cancer. Proc. Soc. Exp. Biol. Med., 26:574, 1929.
7. Wells, H. G.: Chemical Pathology, p. 580. Philadelphia: W. B. Saunders Co., 1925.
8. Slye, Maud: Inheritance Behavior of Cancer as a Simple Mendelian Recessive. Jour. Cancer Res., 10:15, 1926.

DR. BENJAMIN L. WYMAN

IN MEMORIAM

Twenty-three years ago, at the first official meeting of the Southern Medical Association in Birmingham, Dr. Benjamin Leon Wyman was chosen president, to preside over the meeting the ensuing year in Atlanta in 1908. Dr. Wyman was the second president of the Southern Medical Association. During the years that have followed there have been few of its gatherings that he has failed to attend. Shortly before his death, he was an active participant in the work of his section in Miami last November, and served on the committee which nominated the section officers for 1930.

EARLY LIFE

Dr. Wyman was born in Tuscaloosa, Alabama, August 1, 1856. His father was Professor of Latin in the University of Alabama for fifty years, and also for a time President of the University. The Alabama Bryce Institute, or insane asylum, was established in Tuscaloosa in 1861 under the leadership of the celebrated alienist whose name it bears, and it was the nearness of the institution to him that fixed his interests upon these sufferers in his youth.

Dr. Wyman's early education was in the public schools of Tuscaloosa. He was graduated from the University of Alabama, and took his M.D. degree from the University of Virginia one year later, in 1878. He was graduated also from the University of New York and became assistant physician in the New York Insane Asylum and later resident physician at Randall's Island Hospital in New York. He was associated in the Alabama Bryce Institute with modern pioneers in treatment of the mentally diseased.

Dr. Wyman moved to Birmingham in 1886 and made his home there for more than forty years, keeping up a large practice and maintaining his interest chiefly in nervous and mental diseases. During this time he was president of the Jefferson County Medical Society, of the Alabama State Medical Association, and a member of the Board of Censors of the Medical Association of Alabama, which is the State Board of Health. In this latter position he exercised great influence in molding the health code of Alabama. He was a staunch supporter of medical ethics in the strictest sense. Only a short

while before his death he was a leader in a state-wide movement to rid contract practice of its abuses and unethical features. He was throughout his life a very regular and interested attendant at medical gatherings, and was eager to inform himself upon all medical advances.

1908 AND 1929

As one compares the program of the Atlanta meeting, when Dr. Wyman was president of the Southern Medical Association in its infancy, with that of the Miami meeting just past, one sees much of the same spirit running through both, in spite of the difference in subject matter and interests. Many of the young men who led the Association then are still its driving forces, though their medical interests may have changed. The Miami program is much fuller than the Atlanta program, because of the wealth of technical information which has been given the medical sciences in the last quarter of a century. In 1908 there were but three sections. The seventeen sections now represented in the meetings indicate the rapid growth of specialism since that time. In 1912, the first year for which an accurate record of membership can be obtained, there were 1243 members of the Association, about one-seventh of the present membership. Dr. Wyman was an important factor in this growth.

Although at the beginning of his career neurology as a specialty was almost unknown in the South, Dr. Wyman was able in his later years to devote his time to his favorite branch of medicine. He was one of the organizers of the Section on Neurology and Psychiatry of the Southern Medical Association, which held its first meeting in 1921, and he was Section Chairman in 1927.

ADDRESS ON CRIME AND DELINQUENCY

His Chairman's Address, entitled "Crime and Delinquency in Relation to Mental Disorders," was a plea for a much needed reform of the present system of introducing expert testimony, particularly psychiatric testimony, in criminal cases. He wished to eliminate the abuse of the expert witness, as employed in the famous Leopold and Loeb case, when distinguished alienists called by the defense arose to testify before a jury that the defendants were insane, and equally distinguished alienists called by the prosecution arose to testify that they were sane and wholly responsible for their acts. He believed that "Under no circumstances should the psychiatrist be a partisan or accept employment by the defense in a criminal trial where the plea of insanity is the defense. . . . Legal provision should be made for the examination of all offenders by a competent psychiatrist before the defendant is arraigned for trial."

Shortly after his return from the Miami convention his last illness began, and he died January 8, 1930, less than two months later, of nephritis.

The *Birmingham Age-Herald* said of him:

"The death of Dr. Benjamin Leon Wyman takes away from the community a man of the highest professional and personal gifts. His contributions to medical culture and achievement in Alabama have been considerable. His kindliness and approachableness made him one of those friendly spirits enriching every setting in which they appear. Alabamian to the core, he represented the best in the State's life in a warmly human fashion. That he was an alienist of high repute is in the long run not so important as that he was never anything but a modest gentleman and a generous soul."

It is with deepest regret that members of the Southern profession learn of his death. His shoulder at the wheel will be missed. He represented a fine type of his generation, whose footprints on the sands of time should mark a path for many men to follow. One cannot but be glad that he lived a full and happy life of more than three score years and ten, and envy him that he died without knowing any of the symptoms of old age, weakness and gradual loss of the abilities.

Book Reviews

The Blood Picture and Its Clinical Significance (Including Tropical Diseases). A Guidebook on the Microscopy of Blood. By Professor Dr. Victor Schilling, Physician-in-Chief, the First Medical University Clinic, Charite, Berlin. Translated and Edited by R. B. H. Gradwohl, M.D., Director of the Pasteur Institute of St. Louis, and the Gradwohl School of Laboratory Technique, St. Louis, Mo.; Lieutenant-Commander, Medical Corps (Fleet), United States Naval Reserve. Seventh and Eighth Revised Edition. 408 pages with 44 illustrations and 4 color plates. St. Louis: The C. V. Mosby Company, 1929. Cloth, $10.00.

This volume presents in detail the author's methods of evaluating the blood picture. The first sections are devoted to technic and the morphology of normal and pathological blood cells. The classification is at times different from that usually given in American text books. Sections are devoted to the application of the blood picture in both diagnosis and prognosis. This is deduced from the presence of abnormal cells and the stage of development of the normal blood cells.

As many methods are original, they cannot be evaluated until they have had international trial; although from the number of physicians using them their acceptance appears to be rather general in Germany.

There are many original illustrations and colored plates which are well executed.

Diseases of the Stomach and Intestines. By William Fitch Cheney, B.L., M.D., Clinical Professor of Medicine, Stanford University Medical School, San Francisco, Calif. Volume II, Oxford Monographs on Diagnosis and Treatment, Edited by Henry A. Christian, M.D., Boston, Mass. 280 pages. New York: Oxford University Press. Price per set of ten volumes, $100.00.

In this volume of the Oxford Monographs, Cheney has prepared for the general practitioner, a very practical treatise. He limits his discussion of diseases of the stomach to gastritis, ulcer, cancer and syphilis, while the only functional gastric disturbance which he admits exists is gastroptosis. The chapter on chronic gastritis is excellent, but the author is hardly explicit enough in his diet and treatment of ulcer. Few gastro-enterologists will agree with him that gastroptosis is a disease entity, because it is generally accepted as a part of a bodily habitus, and the position of the stomach has nothing to do with the symptoms usually ascribed to gastroptosis.

The author seems enthusiastic about abdominal supporters in gastroptosis. X-ray studies have shown that abdominal belts do not elevate the position of the stomach, but they may be used temporarily to increase intra-abdominal pressure, while improving the nutrition and tone of the abdominal muscles by diet and exercise. The chapters on "appendix dyspepsia" and "gall bladder dyspepsia" contain helpful data for diagnosing chronic appendicitis and gall bladder infections, which may be extra-gastric causes of disturbed function of the stomach.

The last half of the book, devoted to the diagnosis and treatment of diseases of the intestines, is practical, especially the chapters on acute and chronic inflammations of the intestines and colon. In the treatment of amebic dysentery the author advises emetine-bismuth-iodid by mouth and emetine hydrochlorid hypodermatically, but says nothing about diet. Yatrin and anoyoden, the new iodin preparations which are now widely and successfully used in chronic amebic colitis, are not mentioned. The eight rules given in the treatment of intestinal obstruction may serve as excellent guides, but one rule, that is to advise immediate operation in every case of intestinal obstruction not relieved by one or two enemeta, is perhaps better. Some will not agree with the author that intestinal stasis is almost the sole cause of constipation, though the outline of diet and treatment for that condition is very good. Taken altogether, Cheney's monograph on the "Diagnosis and Treatment of Diseases of the Stomach and Intestines" is very well done, but few books of 280 pages are worth $10.00, the publisher's price.

The Diagnosis and Treatment of Arthritis. By Russell L. Cecil, M.D., Sc.D., Assistant Professor of Clinical Medicine, Cornell University; Assistant Visiting Physician, Bellevue Hospital, New York City. Volume VI of Oxford Monographs on Diagnosis and Treatment. Edited by Henry A. Christian, M.D., Sc.D., LL.D, Hersey Professor of the Theory and Practice of Physic, Harvard University, and Physician-in-Chief, Peter Bent Brigham Hospital, Boston, Mass. 216 pages. New York: Oxford University Press, 1929.

In conformity with the other monographs of this series, this book is written for clinical use. It gives the medical aspect of this condition from an unbiased viewpoint, and no attempt is made to describe orthopedic procedures in detail.

The Essentials of Medical Diagnosis. A Manual for Students and Practitioners. By Sir Thomas Horder, Bart., K.C.V.O., M.D., F.R.C.P., Lond., Physician in Ordinary to H.R.H. the Prince of Wales, Physician to St. Bartholomew's Hospital, and A. E. Gow, M.D., F.R.C.P., Lond., Physician with Charge of Out-Patients and Demonstrator of Practical Medicine at St. Bartholomew's Hospital, with 8 color and 11 black and white plates, 22 figures in the text, and 5 charts. New York: William Wood & Co., 1929.

The book is a small manual of the elements of medical diagnosis, brief in its outline. The author has avoided superfluous discussions and descriptions, which adds to the essential value of the book for those who wish hurriedly to review the modern methods of diagnosis and their interpretation.

There are several inaccuracies which somewhat detract from its value. Of especial note is the statement on page 194 that pure mitral regurgitation is of common occurrence, and pure mitral stenosis of uncommon occurrence. The facts as taught today are that, while pure mitral stenosis without some regurgitation is extremely rare, yet the common lesion is mitral stenosis and the uncommon lesion mitral regurgitation.

General Medicine. A Volume of The Practical Medicine Series, Comprising Eight Volumes on the Year's Progress in Medicine and Surgery. Series 1929. Edited by George H. Weaver, M.D., Lawrason Brown, M.D., George R. Minot, M.D., William B. Castle, M.D., William D. Stroud, M.D., and Ralph C. Brown, M.D. Chicago: The Year Book Publishers. Cloth, $3.00.

The manual is a selection of the progress that has been made during this year in general medicine. The selection of the articles and the detail given to them makes the book of great value to the busy practitioner. Each section is edited by an outstanding physician. On account of the multiplicity of medical journals, the average physician is grateful to have some one direct his attention to the more important contributions of the year. In conformity with the new policy of this series, more space is given to infectious diseases.

A Practical Treatise on Disorders of the Sexual Function in the Male and Female. By Max Huhner, M.D., Chief of Clinic, Genitourinary Department, Mount Sinai Hospital Dispensary, New York City; Formerly Attending Genitourinary Surgeon, Bellevue Hospital, Out-Patient Department and Assistant Gynecologist, Mount Sinai Hospital Dispensary, New York City; Member, American Urological Association, American Medical Association, New York Urological Association; Fellow of the New York Academy of Medicine, Etc. Third Edition. 342 pages. Philadelphia: F. A. Davis Company, 1929. Cloth, $3.00.

No discussion of sexual function may now be considered complete which does not include the recent development of knowledge of the sex hormones, male and female. These seem to be unmentioned in the book, which is therefore worthless for modern practice.

Grenz Ray Therapy. By Gustav Bucky, M.D., New York, with Contributions by Dr. Otto Glasser, Cleveland, and Dr. Olga Becker-Manheimer, Hamburg. 170 pages with 40 illustrations. New York: The Macmillan Company, 1929. Cloth, $3.50.

Radiologists and dermatologists in America will be glad to hear reports upon a new therapeutic agent of considerable promise. Bucky here gives an able brief history of the development of the technic of x-ray therapy and of the advantages now offered of delivering to the patient rays "in pure culture," that is, of a particular specified wave length.

The grenz ray has a wave length slightly less than the x-ray, but longer than the ultra-violet. It has many of the healing properties of the x-ray in skin diseases, but is much less penetrating. It is probably of particular value in malignant growths about the face and eye.

It is unfortunate that the author, though he apologizes in the beginning for writing upon a subject still little developed, forgets himself later in the book and injures his cause by declaring the ray of value for treatment of gastric and intestinal ulcers, cases of hypothyroidism, arthritis and menstrual disorders. This will tend to discredit a method which has probably considerable value in a limited field. The volume certainly cannot be considered unimportant by anyone.

Materia Medica and Therapeutics, Including Pharmacy and Pharmacology. By Reynold Webb Wilcox, M.A., M.D., LL.D., D.C.L., Lieutenant Colonel, Auxiliary Reserve, United States Army. Twelfth Edition, revised in accordance with the United States Pharmacopoeia X and the National Formulary V, with an Index of Symptoms and Diseases. 690 pages. Philadelphia: P. Blakiston's Son & Co., Inc., 1929. Cloth, $5.00.

This extensive text book upon materia medica and therapeutics has been thoroughly revised.

The author has reviewed the literature and brought the subject matter up to date, and the book should be especially helpful for the teaching of student classes.

Southern Medical News

ALABAMA

Dr. Stuart Graves, Tuscaloosa, has resigned as Acting State Health Officer. Dr. Graves is Dean of the School of Medicine, University of Alabama, and finds that the duties of the two offices conflict. No appointment to fill the vacancy has been made yet.

Dr. R. F. Lovelady, Birmingham, has been appointed Superintendent of Hillman Hospital, assuming his duties January 15, succeeding Dr. E. P. Hogan, Superintendent for more than 20 years, who resigned recently.

Alabama is to get a $1,000,000 Veterans' Hospital in the near future. Several cities in the State have offered sites for the proposed hospital, but definite announcement as to its location has not been announced.

Dr. Lloyd Noland, Birmingham, has been appointed a member of the Board of Censors and of the State Board of Health.

Dr. B. B. Sims, Talladega, who has been Secretary of the Alabama State Medical Association, resigned recently, and will be succeeded by Dr. Douglas L. Cannon, former State Health Officer.

Dr. W. H. Abernathy, Columbiana, has been appointed Health Officer for Shelby County.

Deaths

Dr. B. L. Wyman, Birmingham, aged 73, died January 8 after an illness of several weeks.

Dr. W. F. Coker, Lincoln, aged 72, died November 18.

Dr. Joseph Anderson Goodwin, Jasper, died October 23.

Dr. John Henry Holley, Samson, aged 64, died November 19 of cerebral hemorrhage.

Dr. William Henry Moon, Goodwater, aged 85, died October 30.

ARKANSAS

Deaths

Dr. John W. Faust, Searcy, aged 55, died November 14.

Dr. Benjamin F. Walker, Jonesboro, aged 60, died November 16.

DISTRICT OF COLUMBIA

Three French physicians, Dr. Andre Bloch, Dr. J. M. LeMee and Dr. Jean Dalsace, who were sent to the United States by the French Ministry of Labor and Health to study surgical and medical methods of the United States, began their survey recently in Washington. They will visit Baltimore, Chicago, Detroit, Rochester, New York and Boston.

Dr. Ernest E. Hadley, Washington, who recently resigned from the staff of St. Elizabeth's Hospital, has opened offices in the Columbia Medical Building and will limit his practice exclusively to psychiatry and psychoanalytic therapy.

Dr. Herbert C. Woolley, Washington, has been made First Assistant Physician at St. Elizabeth's Hospital. He was formerly Clinical Director. Dr. Roscoe W. Hall, former Medical Officer at the Hospital, has been promoted to Clinical Director.

Dr. John W. Burke, Washington, has resigned as Professor of Ophthalmology at Georgetown University School of Medicine. He has been succeeded by Dr. James N. Greear, Jr.

The Medical Society of the District of Columbia, the George Washington University and the New York Avenue Presbyterian Church jointly held a memorial service on December 8 in Washington in memory of the late Dr. Charles Richardson, a member of the Board of Trustees of the American Medical Association.

Deaths

Dr. James Joseph Kilroy, Washington, aged 59, died November 20 of heart disease.

Dr. Carl Williamson McGaughey, Washington, aged 49, died November 24 of pneumonia and heart disease.

FLORIDA

Duval County Medical Society recently held its annual election of officers. Dr. H. Marshall Taylor, Jacksonville, was made President; Dr. William McL. Shaw, Jacksonville, Vice-President; Dr. Kenneth Morris, Jacksonville, Secretary (reelected for a fourth term); and Dr. E. C. Swift, Jacksonville, Treasurer. At this meeting the Society was presented a gavel, the wood of which was taken from the house in Danville, Kentucky, where Dr. Ephraim McDowell performed the first abdominal operation in 1809.

The Hillsboro County Medical Society, Tampa, is cooperating with the Hillsboro County School Board in working out and maintaining a uniform health nursing program for the school children of that County.

The Escambia County Medical Society recently elected the following officers for this year: Dr. Carl C. Webb, President; Dr. J. H. Fellows, Vice-President; and Dr. J. M. Hoffman, Secretary-Treasurer, all of Pensacola.

The Lake County Medical Society, at its recent annual meeting, elected the following officers for 1930: Dr. Chas. H. Lodor, Eustis, President; Dr. J. D. Couplan, Eustis, Vice-President; Dr. W. L. Ashton, Umatilla, Secretary-Treasurer; Dr. H. G. Holland, Leesburg, Delegate to the State Meeting, and Dr. S. C. Colley, Tavares, Alternate.

Dr. Bundy Allen, Tampa, has been signally honored by being elected President of the Radiological Society of North America for this year.

Dr. W. M. Bevis, formerly of Lakeland, has been made Chief of Reception Service at the Veterans' Hospital, Northport, Long Island, New York.

Dr. C. S. Hassell, Miami, has reopened his offices in the Huntington Building, limiting his practice to urology.

Dr. George R. Maner, Tampa, has been elected President of the Seminole Civic Club of that City.

Dr. Ernest B. Milam, Jacksonville, has been elected President of the Jacksonville Kiwanis Club for 1930.

Dr. C. Larimore Perry, Miami, announces the opening of his offices in the Huntington Building. He will limit his work to general surgery and surgical diagnosis.

Dr. C. W. Shackelford, Palm Beach, has moved his offices to the Palm Way Building.

Dr. Ferdinand Richards, Jacksonville, and Miss Marguerite Ragsdale, also of Jacksonville, were married November 6.

Dr. G. W. Richardson, Jacksonville, and Miss Etta Morris, Orangeburg, South Carolina, were married December 4.

A monkey farm is to be established at Orange Park by Yale University. The Rockefeller Foundation has given Yale $500,000 to establish a special laboratory station on a 200-acre tract for the breeding and scientific study of antropoid apes.

GEORGIA

The Georiga State Board of Health and the Children's Bureau of the Department of Labor, Washington, sponsored a five-day course in the principles and practices of obstetrics given at Canton. Dr. Jas. R. McCord, Atlanta, gave a lecture each day and also showed moving pictures from the leading clinics of America and Europe.

A movement has been started in Atlanta to build a new Grady Hospital at a new location and turn over the present building for the use of negro patients. The present location of the Hospital is not very desirable owing to the negro population in that locality and the encroachment of industries.

Dr. William H. Goodrich, Dean of the Medical Department, University of Georgia, was elected President of the Georgia and Florida Railroad Surgeons' Association which was organized recently.

Dr. W. L. Green, Jr., has removed from Oconee to Crawford.

Dr. O. D. Hall, Atlanta, announces the opening of a Radium Clinic at 106 Linden Avenue, N. E., and the removal of his offices to that address.

Dr. Wm. W. Puett has removed from Eastman to Duluth.

Dr. Jas. R. McCord, Atlanta, announces the removal of his office to 50 Armstrong Street, S. E.

Dr. Henry Cliff Sauls, Atlanta, has moved his office to the Medical Arts Building, practice limited to internal medicine.

Dr. C. D. Vinson has removed from Atlanta to Macon with offices in the Macon National Bank Building.

Deaths

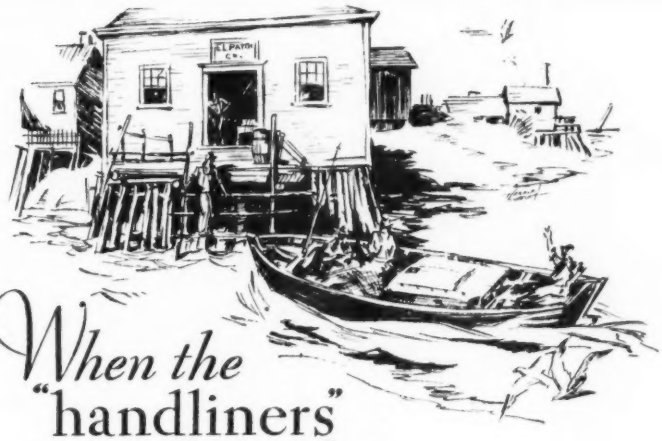
Dr. William Lewis Davis, Albany, aged 65, died November 11.

Dr. Robert H. Twiggs, Hiawassee, aged 72, died October 31 of heart disease.

KENTUCKY

The Casey County Medical Society has elected the following officers for 1930: Dr. L. F. Hammonds,

(Continued on page 34)



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The efforts of these Patch workers augment the work of the men making oil on the deep sea boats, so that you, doctor, may have at your disposal Patch's Flavored Cod Liver Oil with its typical palatability, its richness in both the vitamins A and D which have served you so well for many years.

Abundant clinical experience points to the value of the combined vitamins A and D in stepping up resistance and building up energy in addition to the antirachitic factor.

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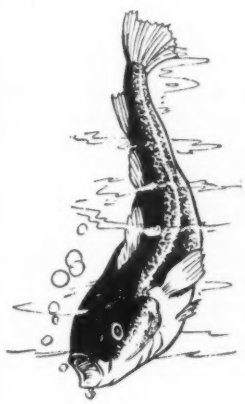

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Manufacturers of Gas-Oxygen Machines, the Metabolor and Surgical Pump

(Continued from page 178)

Dunville, President; and Dr. Wm. J. Sweeney, Liberty, Secretary.

Dr. W. O. Johnson, Louisville, announces the removal of his offices to the Brown Building.

Dr. Norman Westlund, Monticello, has been appointed Health Officer for Wayne County, succeeding Dr. James F. Young, retired.

Dr. C. Dwight Townes, Louisville, is now associated with Dr. Adolph O. Pfingst with offices in the Heyburn Building, practice limited to ophthalmology.

Dr. Russell R. Rudd, Fulton, and Miss Frances Rice, Hickman, were married October 12.

Dr. Charles A. Neal, Nicholsville, and Miss Narcissa Tyler were married November 27.

Deaths

Dr. Chilles Wade Cain, Somerset, aged 62, died November 19 of pneumonia.

Dr. Frank Lee Cessna, Louisville, aged 65, died November 17 of bronchopneumonia.

Dr. Thomas Gayle Connell, LaGrange, aged 50, died November 28.

Dr. Preston Cornelius, Berea, aged 67, died November 1 of influenza.

Dr. John D. Hamilton, Louisville, aged 71, died November 14 of heart disease.

Dr. Samuel Justus Harris, Philpot, aged 87, died November 29.

Dr. John Wilson White, Flippin, aged 62, died November 19 of chronic nephritis and chronic myocarditis.

LOUISIANA

The Charity Hospital Medical Staff, New Orleans, has elected the following officers for 1930: Dr. J. A. Storck, Chairman; Dr. Adolph Noah, Vice-Chairman; and Dr. I. L. Robbins, Secretary.

The Bienville Parish Medical Society has elected the following officers for 1930: Dr. R. C. Ferguson, Arcadia, President; Dr. O. L. Kidd, Gibsland, Vice-President; Dr. J. N. Blume, Arcadia, Secretary-Treasurer; Dr. J. L. Wade, Arcadia, Delegate; and Dr. C. C. Alums, Ringgold, Alternate.

The Claiborne Parish Medical Society has elected the following officers for this year: Dr. J. W. Featherstone, Homer, President; Dr. C. O. Wolff, Haynesville, Vice-President; Dr. E. A. Campbell, Homer, Secretary-Treasurer; Dr. J. R. Turner, Homer, Delegate, and Dr. F. Palmer, Homer, Alternate.

The DeSoto Parish Medical Society has elected the following officers for the ensuing year: Dr. H. P. Curtis, Mansfield, President; Dr. B. K. Parrish, Mansfield, Vice-President; Dr. D. C. McCuller, Mansfield, Secretary-Treasurer; Dr. W. B. Hewitt, Mansfield, Delegate.

The East and West Feliciana Bi-Parish Medical Society has elected the following officers: Dr. Glenn J. Smith, Jackson, President; Dr. S. L. Shaw, Clinton,

(Continued on page 36)

DUKE UNIVERSITY SCHOOL OF MEDICINE

DURHAM, N. C.

On October 1, 1930, carefully selected first and third year students will be admitted. Applications may be sent at any time and will be considered in the order of receipt. Catalogues and application forms may be obtained from the Dean.

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(Continued from page 34)

Vice-President; Dr. E. M. Toler, Clinton, Secretary-Treasurer; Dr. W. Lea, Jackson, Delegate.

Deaths

Dr. Marvin Cappel, Alexandria, aged 40, died November 9.

Dr. Harold Edwards Carney, Monroe, aged 41, was killed November 6 by a train which struck the automobile he was driving.

Dr. Shirley Houston Betts, Shreveport, aged 43, died October 22 of coronary thrombosis.

MARYLAND

The Baltimore City Medical Society held its annual meeting in December and elected the following officers for this year: Dr. Charles Bagley, President; Dr. Louis P. Hamburger, Vice-President; Dr. Edward P. Smith, Secretary; Dr. Charles Emil Brack, Treasurer.

The Baltimore County Medical Society has elected the following officers for the ensuing year: Dr. A. M. Bacon, Parkville, President; Dr. W. P. E. Wyse, Pikesville, Vice-President; Dr. William R. Dunton, Catonsville, Secretary-Treasurer.

The Frederick County Medical Society has elected the following officers for 1930: Dr. Victor Cullen, State Sanatorium, President; Dr. P. S. Lansdale, Frederick, First Vice-President; Dr. J. G. F. Smith, Brunswick, Second Vice-President; Dr. F. D. Worthington, Frederick, Secretary; Dr. William C. Johnson, Frederick, Treasurer.

A twenty-bed hospital will be constructed soon at Chestertown. The funds were raised by residents of Kent and the upper part of Queen Anne's County to build and equip this hospital.

Dr. Herbert L. Fossey, formerly with the Gallinger Municipal Hospital, Washington, D. C., has been made Assistant Physician at the Eastern Shore State Hospital, Cambridge.

Dr. Victor F. Cullen, Director of the Maryland State Tuberculosis Association Sanatoriums, cooperating with the State Health Department and the Tuberculosis Association, will conduct clinics each month in Carroll and Frederick Counties. Dr. Charles D. Steenken, Superintendent, Eastern Shore Tuberculosis Sanatorium, Cambridge, will conduct similar clinics in Caroline, Dorchester, Somerset, Worcester and Wicomico Counties. These clinics will be free.

Dr. Winford H. Smith, Director of Johns Hopkins Hospital, Baltimore, announces that a new 350-bed clinic will be built on the Hospital grounds. This will increase the capacity of the Hospital 165 beds and the entire bed capacity will be used for ward purposes and the poor of Baltimore. The improvements will cost $1,300,000, which has been supplied by the General Education Board of New York. They expect to complete the new building in two years.

The University of Maryland School of Medicine has been given $150,000 by the late Dr. John F. B. Weaver, of Manchester. The money is to be used ultimately to establish a professorship, fellowship or research fund.

Dr. Richard D. Leonard, formerly of Fargo, N. D., has been appointed Chief of the Division of Oral Hygiene of the State Department of Health of Maryland.

Dr. John M. T. Finney, Baltimore, held a surgical clinic at the University of Maryland on December 5, the clinic being held under the auspices of the Division of Medical Extension.

Deaths

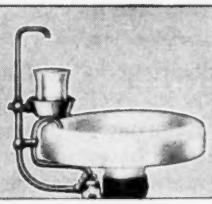
Dr. Henry Alan Naylor, Pikesville, aged 51, died November 15 of angina pectoris.

Dr. John Frederick B. Weaver, Manchester, aged 88, died October 29 of carcinoma of the parotid gland.

MISSISSIPPI

The Clarksdale and Six Counties Medical Society has elected the following officers for 1930: Dr. L. B. Austin, Rosedale, President; Dr. S. H. Brevard, Deeson, Vice-President for Bolivar County; Dr. A. W.

(Continued on page 38)



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B. B. Culture Laboratory, Inc.
Yonkers, N. Y.

(Continued from page 36)

Rhyne, Coahoma, Vice-President for Coahoma County; Dr. J. L. Harris, Swan Lake, Vice-President for Tallahatchie County; Dr. W. W. Nobles, Tunica, Vice-President for Tunica County; Dr. D. V. Galloway, Clarksdale, Secretary-Treasurer; and Dr. T. G. Hughes, Clarksdale, member of the Board of Censors.

The Issaquena-Sharkey-Warren Counties Medical Society, at their recent annual meeting, elected the following officers for 1930: Dr. L. J. Clark, Vicksburg, President; Dr. W. H. Scudder, Myersville, Vice-President for Issaquena County; Dr. H. S. Goodman, Cary, Vice-President for Sharkey County; Dr. P. S. Herring, Vicksburg, Vice-President for Warren County; and Dr. Leon S. Lippincott, Vicksburg, Secretary-Treasurer.

The Tri-County Medical Society has elected the following officers for the coming year: Dr. W. L. Little, Weson, President; Dr. E. H. Deherry, Hazlehurst, Dr. O. N. Arrington, Brookhaven, Dr. R. E. Sylvestein, Tylertown, Dr. T. F. Conn, Silver Creek, Vice-Presidents; and Dr. J. R. Markette, Brookhaven, Secretary-Treasurer.

The Staff of the Vicksburg Sanitarium, Vicksburg, has elected the following officers for the ensuing year: Dr. L. J. Clark, President; Dr. J. A. K. Birchett, Jr., Vice-President; and Dr. Leon S. Lippincott, Secretary.

The Seventeenth Annual Conference of Health Officers and Sanitary Inspectors of Mississippi was held in Jackson on December 11-12.

Dr. J. C. Branham, formerly of New York and Miami, has been appointed Resident Surgeon of the South Mississippi Charity Hospital, Jackson.

Dr. Wallace L. Britt, Jackson, announces the removal of his office to the Standard Life Building.

Dr. Hardie R. Hays, Jackson, has opened his offices at the Capitol City Clinic, 941 Robinson Street.

Dr. R. S. Savage, Brookhaven, and Miss Ruth Brock, Magnolia, were married November 6.

(Continued on page 40)

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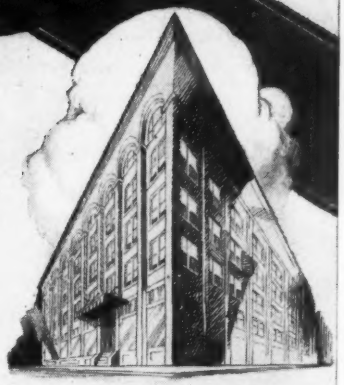

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CHICAGO ST. LOUIS LOS ANGELES

(Continued from page 38)

Deaths

Dr. Horace C. Brashear, Winterville, aged 75, died October 2 of carcinoma of the esophagus.

Dr. Ira B. Bright, Greenwood, aged 69, died November 15 of carcinoma of the pancreas.

Dr. Robert Morris Butler, McComb, aged 56, died October 12.

Dr. A. D. Felder, Magnolia, aged 68, died October 25 of chronic nephritis.

Dr. John Harvey Johnson, Brookhaven, aged 63, died November 20 of chronic myocarditis and arteriosclerosis.

Dr. Robert C. Johnston, Laurel, aged 82, died November 21 of heart disease.

Dr. Walter Rembert Thompson, Moss Point, aged 79, died November 13.

MISSOURI

The Clay County Medical Society has elected the following officers for 1930: Dr. E. C. Robichaux, Excelsior Springs, President; Dr. R. E. Sevier, Liberty, Vice-President; Dr. J. J. Gaines, Excelsior Springs, Secretary-Treasurer, reelected.

The Cole County Medical Society has elected the following officers for this year: Dr. J. T. Leslie, Jefferson City, President; Dr. M. R. Aldridge, Jefferson City, Vice-President; Dr. James A. Hill, Jefferson City, Secretary-Treasurer.

The Boone County Medical Society has named the following officers for 1930: Dr. W. O. Fischer, Columbia, President; Dr. W. E. Belden, Columbia, Vice-President; Dr. H. P. Muir, Columbia, Secretary-Treasurer.

The Greene County Medical Society has elected the following officers for the coming year: Dr. Robert Glynn, Springfield, President; Dr. O. C. Horst, Springfield, Vice-President; Dr. J. N. Wakeman, Springfield, Secretary; and Dr. W. E. Handley, Springfield, Treasurer.

The Howell-Oregon-Texas County Medical Society elected the following officers at their recent meeting: Dr. Lee E. Toney, West Plains, President; Dr. D. D. Cox, Pomona, Vice-President; Dr. A. H. Thornburgh, West Plains, Secretary-Treasurer.

The Pike County Medical Society has elected the following officers for this year: Dr. T. Hurley Willcoxen, Bowling Green, President; Dr. W. M. Bartlett, Clarksville, First Vice-President; Dr. J. E. Bankhead, Clarksville, Second Vice-President; Dr. E. A. Cunningham, Louisiana, Secretary-Treasurer.

The St. Louis County Medical Society recently elected the following officers for 1930: Dr. R. B. Denny, Creve Coeur, President; Dr. C. P. Dyer, St. Louis, Vice-President, and Dr. E. E. Tremain, St. Louis, Secretary-Treasurer.

The Southeast Missouri Medical Association has elected the following officers for the coming year: Dr. M. H. Shelby, Cape Girardeau, President; Dr. W. S. Love, Charleston, Recording Secretary; Dr. E. J. Nienstedt, Blodgett, Corresponding Secretary; and Dr. Paul Baldwin, Kennett, Treasurer.

The Southwest Missouri Medical Association has elected the following officers for 1930: Dr. J. C. B. Davis, Willow Springs, President; Dr. Arthur D. Knabb, Springfield, First Vice-President; Dr. A. C. Ames, Walnut Grove, Second Vice-President; Dr. W. L. Turner, Springfield, Recording Secretary; Dr. Jos. W. Love, Springfield, Corresponding Secretary; and Dr. Lee Cox, Springfield, Treasurer.

The Central Association of Obstetricians and Gynecologists was recently organized in St. Louis and held its first meeting on December 6-7. At this meeting Dr. Palmer Findley, Omaha, was elected Chairman and Dr. E. D. Plass, Iowa City, Iowa, Secretary.

The Missouri Baptist Hospital, St. Louis, has just completed a new six-story addition to house the bone and joint surgery department of the Hospital. This addition cost about $375,000 and increased the bed capacity to 500, making this the largest private general hospital in the Middle West. Dr. B. A. Wilkes has been Superintendent of this institution for the past nine years.

(Continued on page 42)

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. . . especially suggested, at this time of the year, as a nasal spray, mouth wash and gargle.

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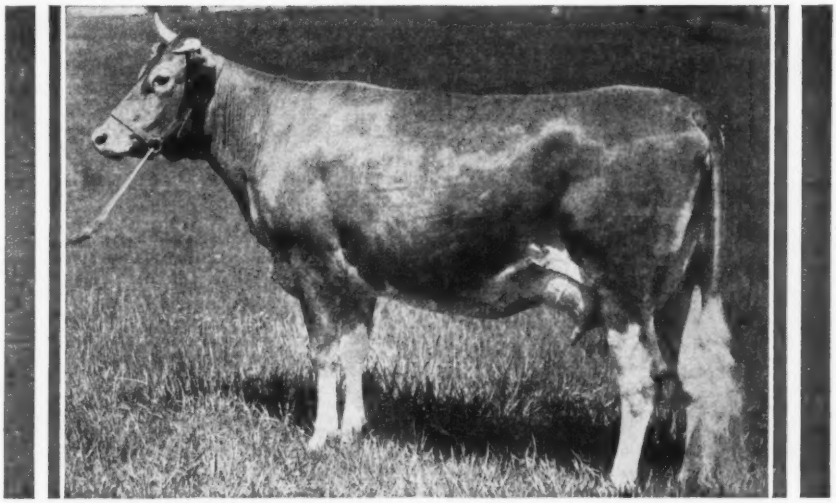

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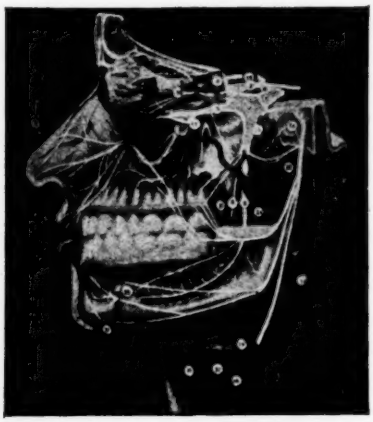

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(Continued from page 40)

Dr. Claude J. Hunt, Kansas City, has just returned from Europe, where he spent the past three months visiting the surgical centers and clinics.

Dr. Russell L. Haden, Kansas City, has been given a gold medal by the Radiological Society of North America for his research work in the x-ray study of dental infection. This award is the highest gift in the Society and was given Dr. Haden at the recent annual meeting in Toronto. At the same time Dr. Joseph C. Bloodgood, Baltimore, Maryland, was given a similar medal for his work in the study of bone malignancy. Only eighteen persons have been awarded the Society's medal.

Dr. Loren Swaney, Hickman Mills, was honored recently by three churches in his community who gave a testimonial dinner to celebrate his eightieth birthday and to express appreciation of his fifty-five years of service to the community.

Deaths

Dr. Charles Loring Anderson, Kansas City, aged 61, died December 6 of lobar pneumonia.

Dr. Harold W. Anderson, Kansas City, aged 27, died December 15 of pneumonia.

Dr. John Monahan Doyle, St. Joseph, aged 55, died November 7 of osteogenic sarcoma of the right humerus.

Dr. John Ransom Hamill, Kansas City, aged 65, died November 19 of heart disease.

Dr. Cassius M. Ketcham, Carthage, aged 66, died October 21 of nephritis and uremia.

Dr. Clyde Chisholm Ratcliff, St. Louis, aged 24, died November 8 of pneumonia.

Dr. Charles G. Rohlfing, aged 85, died October 14 of pneumonia.

NORTH CAROLINA

The Tenth District Medical Society has elected the following officers for the year: Dr. J. G. Anderson, Asheville, President, and Dr. D. M. McIntosh, Old Fort, Secretary, reelected.

The Fourth District Medical Society recently elected Dr. Thel Hooks, Smithfield, President; Dr. G. E. Bell, Wilson, Vice-President; and Dr. W. B. Kinlaw, Rocky Mount, Secretary-Treasurer.

The Iredell-Alaxander Counties Medical Society has elected the following officers for 1930: Dr. L. M. Little, Statesville, President; Dr. J. S. Talley, Troutman, Vice-President; Dr. Roy C. Tatum, Statesville, Secretary-Treasurer.

The Cabarrus County Medical Society has named the following officers for this year: Dr. I. A. Yow, President; Dr. J. R. Howard, Vice-President; and Dr. D. G. Caldwell, Secretary-Treasurer; all of Concord.

The Mecklenburg County Medical Society has elected the following officers for 1930: Dr. L. G. Gage, Charlotte, President; Dr. R. T. Ferguson, Charlotte, Vice-President; and Dr. R. B. McKnight, Charlotte, Secretary.

Dr. Andrew J. Crowell, Charlotte, was recently honored by being elected to membership in the International Urological Society. The next meeting of the Society will be in Madrid, Spain.

Drs. J. R. and J. F. Gamble, Lincolnton, have purchased a lot on which they expect to construct a clinic building in the spring. The building will include an x-ray room, operating room, offices and consultation rooms on the first floor and the second floor will be entirely for patients.

The new Martha Jefferson Hospital, Charlottesville, which cost $100,000 and whose donor is anonymous, was opened on December 1.

Dr. J. E. Hobgood, formerly of Thomasville, is now on the medical staff of the State Hospital, Morganton.

Dr. Thomas M. Jordan, Raleigh, has resigned his position at the State Hospital and is succeeded by Dr. I. W. Lamm, of Lucama.

Dr. Julian A. Moore, Asheville, has opened offices in the Flatiron Building, practice limited to general and thoracic surgery.

Dr. John Q. Myers, Charlotte, announces he has associated with him Dr. D. C. Jones, who has recently completed his internship at the University of Pennsylvania Hospital.

(Continued on page 44)

Danger of Undulant Fever

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Not If You Prescribe Dryco

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Originator, Owner and Maker

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(Continued from Page 44)

Dr. Leora Perry, formerly of Ridgeland, South Carolina, has located at Charlotte.

Dr. J. M. Peterson, Spruce Pine, has removed to Johnson City, Tennessee.

Dr. Forest M. Houser, Cherrville, and Miss Blanche Duey, Quincy, Pennsylvania, were married November 25.

Deaths

Dr. John William Baird, Mars Hill, aged 48, died November 7 of heart disease.

Dr. William George Byrd, Goldsboro, aged 54, died suddenly October 25 of heart disease.

Dr. Walter P. Craven, Charlotte, aged 84, died December 5.

Dr. Roderick H. Gary, Murfreesboro, aged 72, died October 24 of cerebral hemorrhage.

Dr. Augustus A. McDonald, Jackson Springs, aged 52, died September 17 of uremia.

Dr. Walter Ingold Pitts, Lenoir, aged 50, died November 19.

Dr. A. F. Toole, Asheville, died recently after a long illness.

OKLAHOMA

The Southern Oklahoma Medical Association has elected the following officers for 1930: Dr. F. M. Harrison, Ardmore, President; Dr. A. B. Leeds, Chickasha, President-Elect; Dr. J. W. Nieweg, Duncan, Secretary-Treasurer; Vice-Presidents for the different counties: Caddo, Dr. E. W. Rogers, Carnegie; Carter, Dr. F. W. Broadway, Ardmore; Comanche, Dr. G. S. Barber, Lawton; Cotton, Dr. G. W. Baker, Walters; Garvin, Dr. G. L. Johnson, Pauls Valley; Grady, Dr. D. S. Downey, Chickasha; Jefferson, Dr. W. M. Browning, Waurika; Love, Dr. Dave Autry, Marietta; Murry, Dr. O. W. Sprouce, Sulphur; Stephens, Dr. D. Long, Duncan; Dr. A. J. Weedn, Duncan, President Emeritus.

The Ottawa Medical Society has elected the following officers for this year: Dr. L. W. Trout, Afton, President; Dr. B. W. Ralston, Commerce, First Vice-President; Dr. General Pinnell, Miami, Second Vice-President; Dr. J. W. Craig, Miami, Secretary; and Dr. C. A. McLelland, Miami, Censor.

Dr. Marvin E. Stout, Oklahoma City, has just opened The Polyclinic Hospital. It is a fire-proof building with a capacity of 75 beds and has all modern hospital equipment.

Dr. W. W. Hicks, formerly of Okmulgee, is doing post-graduate work in oto-laryngology at Mayo Clinic and will afterwards locate in the State of Washington.

Dr. Frank H. McGregor, Mangum, was recently detailed for a month's service in the War College at Washington, D. C.

Dr. W. T. Tilly, formerly of Muskogee, has located at Fayetteville, Arkansas.

Dr. Fred S. Watson, Okmulgee, has returned and opened his offices in the Commerce Building. He spent the past two years at the Graduate School of Medicine, University of Pennsylvania.

Dr. Leonard C. Williams, formerly of Osage, has moved to Oklahoma City and opened offices in the Osler Building.

Deaths

Dr. Edward R. Askee, Hugo, aged 50, died in November of cardiorenal disease.

SOUTH CAROLINA

The Tuomy Hospital, Sumter, will start construction at once on a $100,000 addition.

Dr. Marion H. Wyman, Columbia, was recently elected President of the Urological Association of South Carolina.

Dr. Hugh B. Senn, Health Officer for Beaufort County, was marooned for several days in October at Bluffton during high waters and was rescued by an oyster bed inspection boat of the State Board of Health.

Deaths

Dr. Meigs Conkling Stannard, Columbia, aged 35, died in October.

(Continued on page 46)

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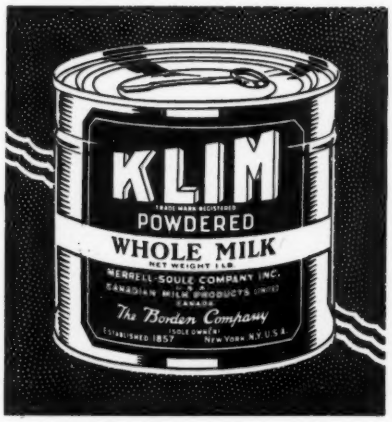

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(Continued from page 44)

TENNESSEE

Dr. Duncan Eve, Jr., Nashville, has been appointed Chief Surgeon of the Nashville, Chattanooga and St. Louis Railway, succeeding his father, Dr. Duncan Eve, Sr., who after fifty-one years of service now becomes Senior Chief Surgeon. In the eighty years of continuous unbroken existence of the N., C. and St. L. Railway it has had only two chief surgeons, Dr. Paul F. Eve, followed by his son, Dr. Duncan Eve, Sr. Dr. Duncan Eve, Jr., is a member of a number of leading medical and surgical associations in this Country, has been President of the American Association of Railway Surgeons, and is Associate Professor of Surgery in Vanderbilt University, from which school he graduated in the class of 1904.

The Middle Tennessee Medical Association recently elected the following officers for 1930: Dr. J. R. Gott, Murfreesboro, President; Dr. Murray B. Davis, Nashville, Vice-President; and Dr. Theodore Morford, Nashville, Secretary-Treasurer.

The Robertson County Medical Society has elected the following officers for this year: Dr. J. W. Thomas, Cross Plains, President; Dr. S. J. Fentress, Goodlettsville, Vice-President; and Dr. W. F. Fyke, Springfield, Secretary-Treasurer.

Dr. W. S. Leathers, Dean of Vanderbilt University School of Medicine, announces that Sir William B. Hardy, of Cambridge University, eminent British scientist and author, will deliver the Abraham Flexner Lectures for 1930-31 at Vanderbilt. Sir William is Director of the Low Temperature Research Station of Bio-chemistry and Bio-physics at Cambridge University and is now engaged in conducting a series of experiments on the cold storage and preservation of foods for the British Government.

Dr. W. F. Boze, Carthage, was recently injured in an automobile accident while driving a patient to a Nashville hospital.

Dr. Robert Pillow, Jr., has resigned from the Pine Breeze Sanitarium, Chattanooga, and will go to Columbia to practice with his father.

Dr. Walter E. Garrey, Professor of Physiology, Vanderbilt University School of Medicine, Nashville, has been elected a member at large of the Medical Division of the National Research Council.

Dr. Beulah Kittrell, who was formerly with the Children's Hospital, San Francisco, has been appointed House Physician at the Riverside-Fort Sanders Hospital, Knoxville.

Dr. Chas. H. Mulherin, Newbern, was painfully injured in an automobile accident in November.

Dr. Earl Dorris, Bolivar, and Miss Opal Andrews, Jackson, were married November 11.

Dr. John McIntire Nokes, Nashville, and Miss Anna Macon Fawcus, University, Virginia, were married November 14.

Deaths

Dr. Michael Campbell, Nashville, aged 85, died October 30 of pneumonia.

Dr. Charles A. Forgey, Columbia, aged 67, died November 13 of an injury received in a fall.

Dr. John William Hatcher, Franklin, aged 74, died November 22 of heart disease.

Dr. J. D. Lawson, Nashville, aged 35, died November 10.

Dr. Robert Elmore Looney, Nashville, aged 52, died December 10.

Dr. R. H. Perry, Nashville, aged 40, died November 15 after a long illness.

TEXAS

The Camp and Camp Hospital, Pecos, was formally opened December 1. It is owned and operated by Dr. Jim Camp, who has associated with him, Dr. Hilliard Camp, his son.

Dr. C. D. Scaff has purchased the Clarksville City-County Hospital and will continue to operate it along the same lines as it is now being conducted. A number of improvements are being made.

A complete health unit has been established in Nolan County with Dr. M. H. Jensen, formerly con-

(Continued on page 48)

Patient Types . . .

The Obstinate Case

The patient with an obstinate case of constipation is generally addicted to self-medication and "tries everything." Each bowel-whipping cathartic simply drives the tired bowel from bad to worse.

The doctor knows it is possible to restore the normal daily "habit time" of bowel movement by appropriate diet, exercise and the mechanical aid afforded by Petrolagar.

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NEW ORLEANS, LA.

(Continued from page 44)

nected with health relief work in Louisiana, as head of the organization. The unit consists of a full-time county health officer, nurse, sanitary engineer and secretary.

The Dallas-Southern Clinical Society will hold its spring meeting April 14-18 at Dallas, with headquarters at the Baker Hotel. Clinics, post-graduate teaching and lectures will be given by physicians of national reputation and will cover medicine, surgery and the specialties.

The Travis County Tuberculosis Association was recently organized at Austin, at which time a constitution and by-laws were adopted and twenty-seven directors were elected. Permanent officers will be elected at the first meeting of the Board of Directors. The Association has two projects that it will undertake soon. One is a campaign to raise funds to construct a sanatorium for the hospitalization of tuberculous patients in Austin and Travis County, and the other is the opening of a clinic for the examination and diagnosis of tuberculous patients.

The Mineral Wells Clinical Society, Mineral Wells, has recently been organized, with Dr. J. Edward Johnson as Secretary.

Dr. E. H. Cary, Dallas, has been signally honored by members of the faculty of the Baylor University College of Medicine, who presented to the University a life-size bronze bust of Dr. Cary. Dr. Cary was the first Dean of Baylor.

Dr. D. J. Jenkins, Daingerfield, elected President of the Texas State Medical Association, was recently honored with a banquet given by his friends throughout the State, and the citizens of Daingerfield and Morris County.

Prof. Ernst Fuchs, Vienna, Austria, and Prof. Daniel M. Velez, Mexico City, were recent guests of Dr. John O. McReynolds, Dallas. While in Dallas Dr. Fuchs, who was Professor of Ophthalmology of the University of Vienna for over 50 years, held a diagnostic clinic at St. Paul's Hospital. Dr. Fuchs was awarded the Dana medal for his great contribution to the prevention of blindness at the recent meeting of the National Association for the Prevention of Blindness in St. Louis.

Dr. William Cary Holt, Mexia, and Miss Elise Cosby Brown, Petersburg, were married November 6.

Deaths

Dr. Ozro White Cunningham, Valley View, aged 58, died September 2 of cerebral hemorrhage.

Dr. Joseph Edward Dildy, Brownwood, aged 59, died November 5 of angina pectoris.

Dr. Adoniram J. Farrell, Hallettsville, aged 72, died in November.

(Continued on page 50)

CLASSIFIED ADVERTISEMENTS

FOR SALE—One American sterilizer complete, for gas; two ten-gallon water sterilizers; one 16x30 dressing sterilizer; one 6x8x16 instrument sterilizer, mounted. In use six years, very cheap to interested parties. Write Dr. Paul E. Coil, 711 East Jackson Street, Mexico, Mo.

HOSPITAL FOR SALE—Western Texas. In territory of cotton, cattle, oil, twenty-bed hospital. Nearest hospital thirty miles distant. Owner, who is chief surgeon, wishes to retire. Address R. L. C., care Journal.

TECHNICIANS are in demand. We are successfully training laboratory and x-ray workers. Send us your assistant and we will return you a competent technician. If you are in immediate need of a well-trained helper, write or phone. Full information upon request. Alabama Pathological Laboratory, Birmingham General Hospital, Birmingham, Ala.

DRUG AND ALCOHOLIC PATIENTS are humanely and successfully treated in Glenwood Park Sanitarium, Greensboro, N. C.; reprints of articles mailed upon request. Address W. C. Ashworth, M.D., Owner, Greensboro, N. C.

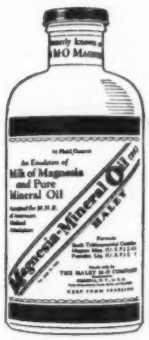
This is the merger age—

Consolidation and combination are the twin screws of modern business methods. Therapeutic practice has long endorsed the use of synergistic medication. Combination of Lubricant, Laxative and Antacid action assures successful results.

Magnesia-Mineral Oil (25)

HALEY

formerly HALEY'S M-O, Magnesia Oil,



is a uniform, permanent, unflavored emulsion of Magma Mag (dram iii) and Liq. Petrolatum (dram i) to the tablespoonful.

A countrywide questionnaire of physicians and dentists gives as indications for use:

Gastro-intestinal hyperacidity, fermentation, flatulence, gastric or duodenal ulcer, constipation, autotoxemia, colitis, hemorrhoids, before and after operation, during pregnancy and maternity, in infancy, childhood, old age, convalescence, invalid or cachectic states.

AN EFFECTIVE ANTACID MOUTH WASH

Accepted for N.N.R. by the A.M.A. Council on Pharmacy and Chemistry

Generous sample and literature on request.

THE HALEY M-O COMPANY, Inc., GENEVA, N. Y.

Remember!

CALCREOSE offers the full expectorant action of creosote in a form agreeable to the patient.

Each 4 gr. tablet contains 2 grs. of creosote combined with calcium hydroxide.

when treating stubborn coughs you have available

Calcreose

Meeting the demand for a cough syrup containing *Calcreose* is the new COMPOUND SYRUP OF CALCREOSE ... a tasty, effective remedy for minor respiratory affections.

Each fluid ounce represents Calcreose Solution, 160 minims (equivalent to 10 minims of pure creosote); Alcohol, 24 minims; Chloroform, approximately 3 minims; Wild Cherry Bark, 20 grains; Peppermint, Aromatics and Syrup q.s. *Samples of Tablets and Syrup to Physicians on Request.*

MALTBIE CHEMICAL COMPANY

NEWARK, N.J.

(Continued from page 48)

Dr. Roland J. Hall, Lubbock, aged 68, died suddenly October 25 of angina pectoris.

Dr. Delany T. Pratt, Commerce, aged 63, died October 11 of pulmonary tuberculosis.

Dr. Robert Walter Smith, Donovan, aged 64, died in October of heart disease.

Dr. Frank B. Wheeler, Skidmore, aged 59, died October 28.

VIRGINIA

The Physicians' Journal Club of the Eastern Shore of Virginia was recently organized with the following officers: Dr. John Hamilton, Nassawadox, President; Dr. R. R. Nevitte, Temperanceville, Vice-President; and Dr. James Lynch, Cape Charles, Secretary.

The Accomack County Medical Society has elected the following officers for 1930: Dr. W. W. Kerns, Bloxom, President; Dr. Joseph H. Hiden, Pungoteague, Vice-President; Dr. John W. Robertson, Onancock, Secretary-Treasurer (reelected).

At the sixth annual meeting of the Ex-Interns' Association of St. Elizabeth's Hospital, Richmond, the following officers were elected for this year: Dr. Paul C. Colonna, New York, President; Dr. Harry J. Warthen, Baltimore, Vice-President; and Dr. John S. Horsley, Jr., Richmond, Secretary-Treasurer (reelected).

The Mid-Tidewater Medical Society has named the following officers for 1930: Dr. Horace Hoskins, Saluda, President; Dr. M. H. Eames, Lanexa; Dr. A. W. Lewis, Aylett; Dr. R. D. Bates, Newton; Dr. E. L. W. Ferry, Millers Tavern; Dr. O. L. Powell, Yorktown; Dr. R. R. Hoskins, Matthews; Dr. H. A. Tabb, Gloucester, Vice-Presidents; Dr. M. H. Harris, West Point, Secretary; and Dr. Jas. D. Clements, Ordinary, Treasurer.

The Petersburg Medical Faculty held its annual meeting in November and elected the following officers for 1930: Dr. Herbert C. Jones, President; Dr. W. Preston Hoy, Vice-President; and Dr. John Harwood, Secretary-Treasurer; all of Petersburg.

The Virginia Social Hygiene Council has elected the following officers for this year: Dr. C. B. Ransone, Roanoke, President; Dr. Thomas Murrell, Richmond, Vice-President; and Dr. D. C. Smith, University, Secretary.

The Terrace Springs Sanitarium, Richmond, has been converted into an orthopedic hospital and is open to the physicians of Richmond. Dr. Thomas Wheeldon is Chief of Staff. The hospital has thirty-five beds and all the latest equipment for orthopedic work.

The Sectional Meeting of the American College of Surgeons for the States of Virginia, West Virginia, Maryland and the District of Columbia was held in Richmond on January 9 and 10.

The Southern Section of the American Laryngological, Rhinological and Otological Society held its annual meeting in Roanoke on January 18.

Dr. W. K. Dix, Richmond, has opened offices in the Medical Arts Building.

Dr. J. E. K. Flannagan is now associated with Dr. Everett E. Watson at the Mt. Regis Sanatorium, Salem.

Dr. Percy G. Hamlin, formerly with the Eastern State Hospital, Williamsburg, has joined the staff of the State Hospital, Harrisburg, Pennsylvania.

Dr. John S. Horsley, Jr., Richmond, has opened offices in the Medical Arts Building, limiting his practice to surgery. He will continue as Attending Surgeon at St. Elizabeth's Hospital.

Dr. Waverly R. Payne has returned to New Port News and opened offices in the Medical Arts Building, limiting his practice to obstetrics and gynecology. He is also a member of the Surgical Staff of Riverside Hospital.

Dr. James Floyd Terrell, who has been in the U. S. Navy for some years, has opened offices in Rich-

(Continued on page 52)

Pregnancy:
Prenatal Care

As a prophylactic from date of declaration to term, the use of Kalak Water affords the patient a dependable defense against abnormal conditions that may be manifested as a result of mineral depletion.

Presenting a fully saturated solution of calcium as the bicarbonate, Kalak Water helps to supply the need of the patient for this essential base.

Kalak Water Company
6 Church St. New York City

Superior Weapons to Combat Diphtheria

SUPER-CONCENTRATED DIPHTHERIA ANTITOXIN, with less pain to the patient, more rapid absorption, and quicker results, is particularly adapted for the administration of large doses.

DIPHTHERIA TOXOID MÜLFORD, the new prophylactic, is strong diphtheria toxin so modified as to be non-toxic, yet retaining its power to provide lasting and definite immunity.

It is more stable than Toxin-Antitoxin Mixture, contains no serum, therefore does not sensitize the patient to future serum injections. Immunity is developed in a shorter time although only two doses are required.

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ORGANOTHERAPY

can be effective only through the use of dependable endocrine products. The reputation and integrity of the manufacturer is the physician's only guarantee of reliability of those organotherapeutic products for which there is no chemical or biological assay. Every manufacturing process of all our products is supervised by our Analytical and Research Department.

DESSICATED PITUITARY BODY, U.S.P.
CORPUS LUTEUM
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DRIED SUPRARENALS, U.S.P.
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Insure potency and constancy of action by prescribing the products of

G. W. CARNRICK CO.

Manufacturers of Organotherapeutic Products

2-24 Mt. Pleasant Avenue, Newark, New Jersey

(Continued from page 50)

mond, Croyden Apartment Building, and will do general practice.

Dr. C. W. Thomas has removed from Floyd to Martinsville.

Dr. Rudolph Cabell Thomason and Miss Izola Virginia Murford, both of Richmond, were married November 27.

Dr. Alonzo Ray Dawson, Reedville, and Miss Dorothy Elise Walz, Richmond, were married November 19.

Dr. Charles Martin Caravati and Miss Mary Virginia Dore, both of Richmond, were married November 15.

Dr. Horace Rowe Hicks and Miss Virginia Wilson Ferguson, Richmond, were married in October.

Deaths

Dr. Simon P. Conduff, Draper, aged 56, died November 24.

Dr. Alexander S. George, Richmond, aged 84, died November 1 of nephritis and myocarditis.

Dr. Thomas Burr House, Virginia Beach, aged 62, died in October.

Dr. Mathew W. Jewett, Ivanhoe, aged 80, died November 12.

Dr. George Price McCoy, Hopewell, aged 48, died November 5.

Dr. Albert L. Sibold, Newport, aged 55, was killed instantly November 2 when the automobile which he was driving was struck by a train.

WEST VIRGINIA

At the fourth annual meeting of the Hospital Association of West Virginia the following officers were elected: Dr. B. I. Golden, Elkins, President-Elect; Dr. Walter F. Vest, Huntington, First Vice-President; Dr. A. G. Rutherford, Welch, Second Vice-President; and Mr. Joe W. Savage, Charleston, Secretary-Treasurer.

The Barbour-Randolph-Tucker County Medical Society has elected the following officers for 1930: Dr. R. J. Condry, Elkins, President; Dr. W. E. Whiteside, Parsons, Dr. E. M. Hamilton, Belington, Vice-Presidents; and Dr. J. C. Irons, Elkins, Secretary-Treasurer.

The Fayette County Medical Society has elected the following officers for this year: Dr. M. C. Borman, Montgomery, reelected President; Dr. Robert Woods, Oak Hill; Dr. J. Spinks, Mount Hope, and Dr. G. G. Hodges, Kilsythe, Vice-Presidents; Dr. H. A. Walkup, Macdonald, reelected Secretary-Treasurer.

The Grant-Hardy-Hampshire-Mineral Medical Society has elected the following officers for 1930: Dr. Thomas Bess, Keyser, President; Dr. W. A. Flick, Keyser, Dr. A. B. Johnson, Franklin, Dr. James F. Easton, Romney, Dr. O. V. Brooks, Moorefield, and Dr. V. L. Dye, Petersburg, Vice-Presidents; Dr. T. C. Giffin, Keyser, reelected Secretary-Treasurer.

The Greenbrier Valley Medical Society elected the following officers for this year: Dr. H. L. Goodman, Ronceverte, President; Dr. W. E. Myles, White Sulphur, Vice-President; and Dr. A. D. Ferrell, Ronceverte, Secretary-Treasurer.

Dr. A. L. Carson, Jr., formerly of Gary, has been appointed Resident in Obstetrics at the Nursery and Child's Hospital, New York City.

Dr. Harry G. Steele, Bluefield, after serving the Mercer County Medical Society for thirteen continuous years as Secretary, has resigned.

Deaths

Dr. Edgar Jennings Grose, Fayetteville, aged 53, died October 13 of erysipelas.

Dr. Robert A. Haynes, Clarksburg, aged 62, was killed instantly on December 5 when the automobile which he was driving skidded and crashed into a tree.

Dr. Robert E. Lee, Wardensville, aged 62, died November 28 of carcinoma of the stomach.

Dr. John G. Pettit, Terra Alta, aged 50, died December 20.

THE STANDARD
LOESER'S INTRAVENOUS SOLUTIONS
CERTIFIED

Bismuth Intravenously

Loeser's Intravenous Solution of Bismuth

A standardized sterile, stable solution in hermetically sealed Jena glass ampoules, ready to inject. 5 c.c. represent 15 Mg. of metallic Bismuth as the tartrate. Controlled by biologic tests.

ANOTHER LOESER ACHIEVEMENT

Despite the failure of many investigators and the repeated adverse statements in the literature, we have succeeded in making the intravenous injection of Bismuth practical, safe and effective. Lesions heal rapidly following a series of injections administered three times a week.

On account of the freedom from reaction, the safety and simplicity of the technic it is not alone of value to the specialist but particularly adapted for the general practitioner who cannot afford to have serious reactions occur in his office.

$3.00 per box of 6 ampoules.

If you are unable to obtain from your dealer, mail or wire your order direct to

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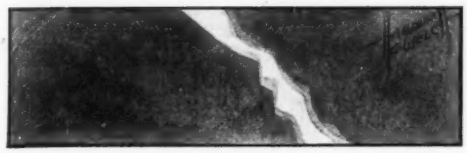

A Natural Aid to the SLUGGISH BOWEL

THERE is a growing tendency among physicians to seek more natural aids in the treatment of constipation than unsatisfactory laxative drugs.

In addition to the careful regulation of diet, provision of adequate bulk and lubrication are conceded to be of prime importance.

It was natural, therefore, for interest to center on the peculiar properties of the seeds of the plant (plantago psyllium) recently made available for use under the name

Psylla

The action of Psylla in the intestinal tract is purely mechanical. On coming in contact with moisture, it swells to a jelly-like mass, giving a bland, bulky, lubricated residue in the intestine—a great aid to the treatment of constipation.

The combined use of Psylla and Lacto-Dextrin (Lactose 73%—Dextrin 25%) affords a most natural method of combating intestinal toxemia and putrefaction by changing the flora.

Let us send you complete literature and free trial packages for test.

The
BATTLE CREEK FOOD COMPANY

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Send me, without obligation, trial tins of Lacto-Dextrin and Psylla, also copy of treatise, "The Intestinal Flora."

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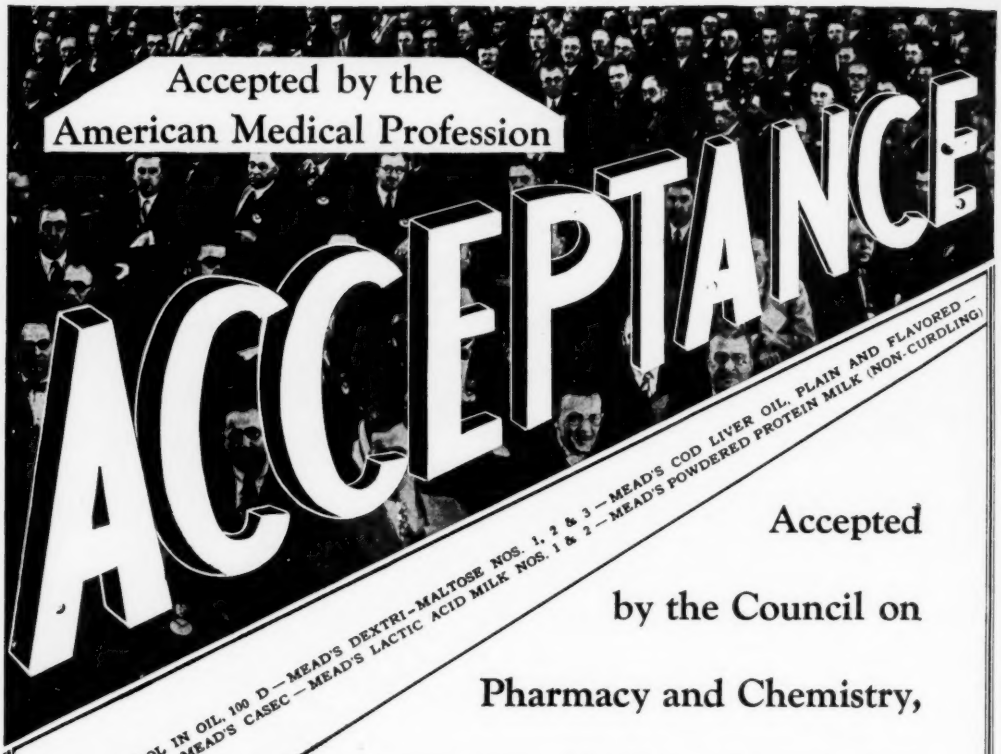
Accepted by the
American Medical Profession
ACCEPTANCE
MEAD'S VIOSTEROL IN OIL, 100 D — MEAD'S DEXTRI-MALTOSE NOS. 1, 2 & 3 — MEAD'S COD LIVER OIL, PLAIN AND FLAVORED —
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"We're for Mead's stronger than ever."

"I stopped using Acterol because of the name but now I'll specify Mead's."

"Regardless of the name, I'm for your product."

"Your unselfish attitude in deferring to the Council's wishes in the matter of nomenclature cannot fail to redound to your best interest."

"Your move in changing the name was wise and you can count on my hearty cooperation."

"Mead's Viosterol or Mead's Acterol—all the same to me—but you have shown by your very commendable action that you are working for the best interests of the A.M.A."

"Your pioneer work on activated ergosterol commands the respect and support of the American medical profession."

For the prevention and cure of rickets and the treatment of tetany and osteomalacia

Mead's Viosterol in Oil, 100 D (originally Acterol) is the first American preparation of activated ergosterol biologically standardized at one hundred times the vitamin D potency of pure Cod Liver Oil. Licensed, Wisconsin Alumni Research Foundation. Accepted, Council on Pharmacy and Chemistry, A. M. A.

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VIOSTEROL
IN OIL 100 D ORIGINALLY ACTEROL
AMERICAN PIONEER
STANDARDIZED
ACTIVATED ERGOSTEROL

No dosage labels—
No dosage circulars

Specify the American Pioneer Product—MEAD'S Viosterol in Oil, 100 D—Mead Johnson & Co., Evansville, Ind.

Every day that Dextri-Maltose is manufactured, control samples for bacteriological analyses are secured from certain points in the process which experience has shown give an accurate picture of the bacteriological condition of the product in the different steps of its manufacture. As a result of experiment and experience, it has been demonstrated that by exercising certain strict sanitary control measures and precautions, the bacteria count can be reduced to the point where the finished product approaches practical sterility. The Petri-dish at right shows a plate count of only 40 bacteria per gram, obtained from a package of Dextri-Maltose selected at random.

THE REALITY OF THE UNSEEN

The things unseen determine the cleanliness, uniformity and safety of Dextri-Maltose. From years of study and experience, we know how to produce the bacteriologically clean product indicated above.

On the other hand, the Petri-dish at the left visualizes the potential danger that may accompany lack of experience. At 37° C., this sample (bought in the open market) showed a bacteria count of 420,000 per gram (compared with 40 per gram in Dextri-Maltose, as mentioned above). Every physician is deeply concerned about the pasteurization, certification, etc., of the cow's milk his babies are fed on, but even sterile milk would give the infant *over seventeen million* bacteria per daily feeding when "modified" with a carbohydrate such as is represented by the Petri-dish at the left.

MEAD JOHNSON & COMPANY, EVANSVILLE, INDIANA, U. S. A.

BOTH Vitamins Definitely Measured

Illustrating "Line Test" method of standardizing Vitamin D content. At left, the leg bone of a rachitic rat showing induced decalcification area (X). At right, healing has begun, as evidenced by initiation of recalcification at dark line (Y).

How can vitamins be "measured?" What is meant by "standardized" when applied to Cod-liver Oil? Here, briefly, is the method followed in determining the vitamin content of Parke-Davis Standardized Cod-liver Oil:

To test for *vitamin A potency* the oil is given orally to young albino rats which have been fed on a diet free from vitamin A. We ascertain how much oil is needed daily to correct the induced typical eye condition (xerophthalmia) and to institute a specified rate of growth. The daily minimum amount of oil required to bring about this change constitutes one vitamin A unit.

Every lot of Parke-Davis Standardized Cod-liver Oil must contain not less than 13,500 units of vitamin A in each fluid ounce.

In determining *vitamin D potency* we use our quantitative adaptation of the "line test" technique of McCollum, Simmonds, Shipley, and Park. The oil is fed to young rats in which rickets has been induced. We measure the minimum amount of oil required per day over a period of ten days to initiate recalcification in the leg bones. This amount represents one vitamin D unit. Each fluid ounce of Parke-Davis Standardized Cod-liver Oil contains not less than 3000 vitamin D units.

Parke, Davis & Company was the first commercial laboratory to assay Cod-liver Oil for both vitamins A and D. Parke-Davis Standardized Cod-liver Oil is backed by years of research work in various phases of nutrition chemistry. Quite aside from its vitamin richness, this product has other distinguishing features which will appeal to you. It is clear, bland, and as nearly tasteless and odorless as a pure Cod-liver Oil can be. May we suggest that in prescribing Cod-liver Oil for your patients you specify the Parke-Davis product?

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To any physician who is personally unacquainted with Parke-Davis Standardized Cod-liver Oil we will gladly send a 4-ounce bottle for free trial.

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